



State of South Carolina

Final Report

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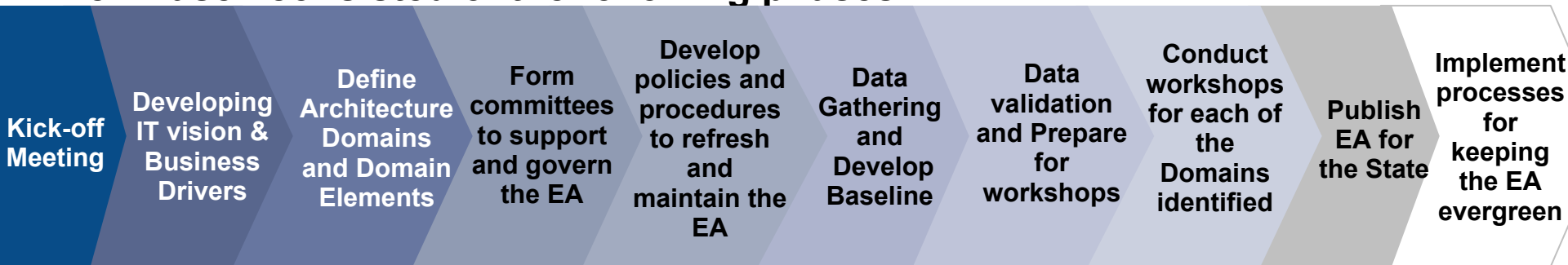
Executive Summary

Executive Summary

Overview of the Process

The State of South Carolina (the State) stakeholders and Gartner Consultants worked closely to develop a high-level Enterprise Architecture (EA) framework and associated strategies and principles for the State by which Information Technology (IT) investments can be targeted.

The Phase I consisted of the following phases:

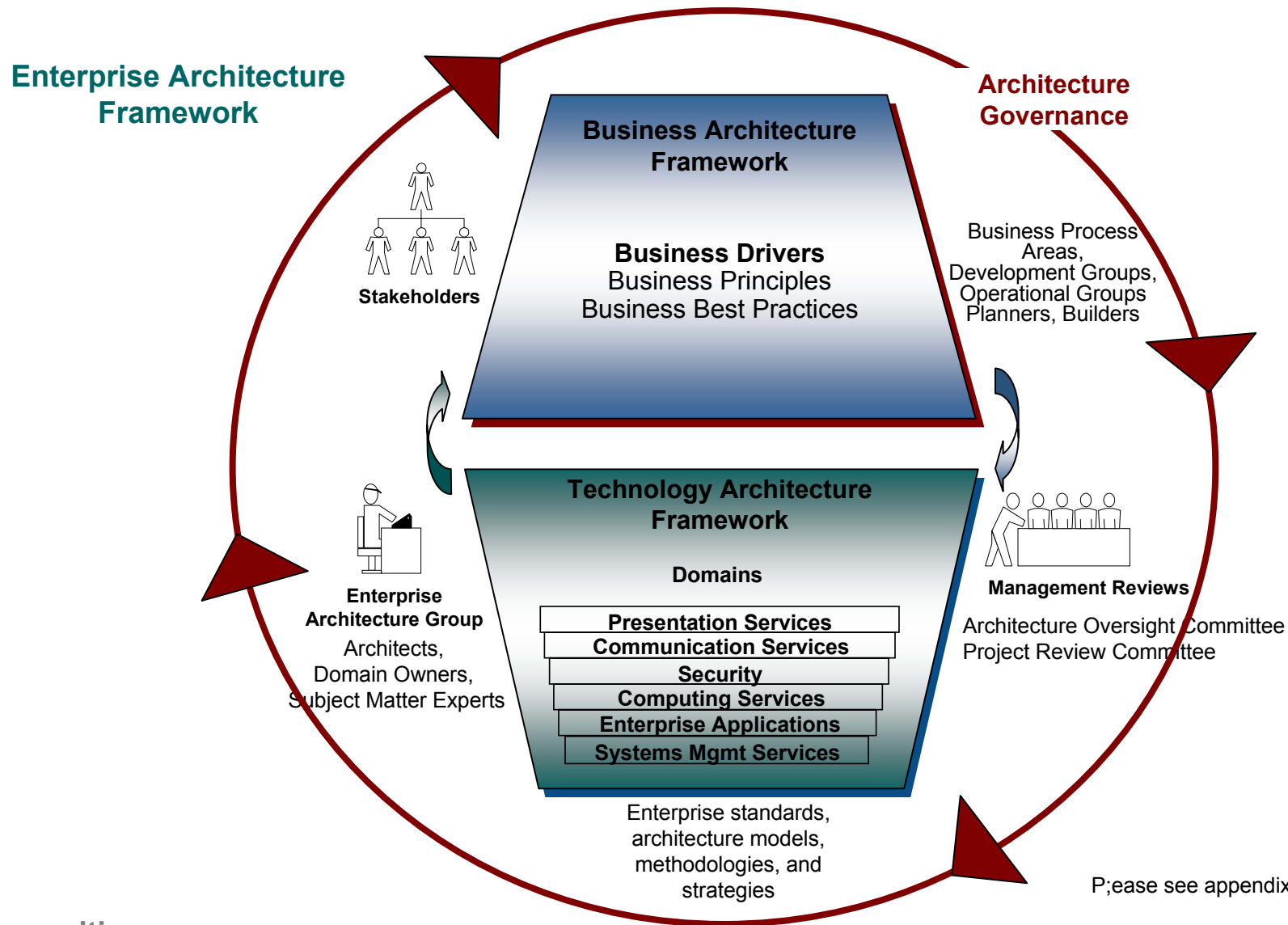


Stakeholders that participated in this engagement:

- Division of the State CIO
- Comptroller General's Office
- Alcohol and Other Drug Abuse Svcs.
- Department of Commerce
- Department of Corrections
- Disabilities and Special Needs
- Employment Security Commission
- State Treasurer's Office
- Department of Mental Health
- Attorney General's Office
- Parks, Recreation & Tourism
- Technical & Comprehensive Education
- Department of Revenue
- Department of Social Services
- Department of Transportation
- Health and Human Services
- Judicial Department
- Labor, Licensing & Regulation
- State Law Enforcement Div
- Patriot's Point Development Authority
- Arts Commission
- Educational Television
- Legislative Printing
- Housing, Finance & Development
- Juvenile Justice
- Probation, Parole and Pardon
- State Accident Fund
- Commission for the Blind
- Natural Resources
- Department of Education

Enterprise Architecture Framework

Overview



Please see appendix for additional details

Executive Summary (Cont'd)

Business Drivers





































Agencies have identified 6 business drivers, which include internal goals, strategies and external trends that influence the business direction of the State. These business drivers are as follows:

- ❑ *Timely and Effective Customer Service*
- ❑ *Recruit, Develop and Retain a Skilled Workforce*
- ❑ *Use Public Resources Efficiently and Effectively*
- ❑ *Support a Growing Mobile Community*
- ❑ *Ensure Security and Privacy*
- ❑ *Meet Legislative and Program Mission/Directives*


Executive Summary (Cont'd)


Linking the State's Business Drivers with the IT Domains — Summary

The following matrix links the State's business drivers to the IT domains identified, in order to meet the current and the future requirements of the individual agency needs as well as the cross-enterprise needs.

IT Domains	Timely and Effective Customer Service	Skilled Workforce	Efficient Use of Public Resources	Support Mobile Community	Data Security & Data Privacy	Legislative & Program Mission/Directives
1. Presentation Services						
2. Communication Services						
3. Security						
4. Computing Services						
5. Enterprise Applications						
6. Systems Management Services						

Business driver impact on IT domain:

 Maximum Impact

 Strong Impact

 Average Impact

 Minor Impact

 Minimal Impact

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Domain Strategies

The State of South Carolina will achieve the Information Technology goals by executing the following long-term Domain strategies:

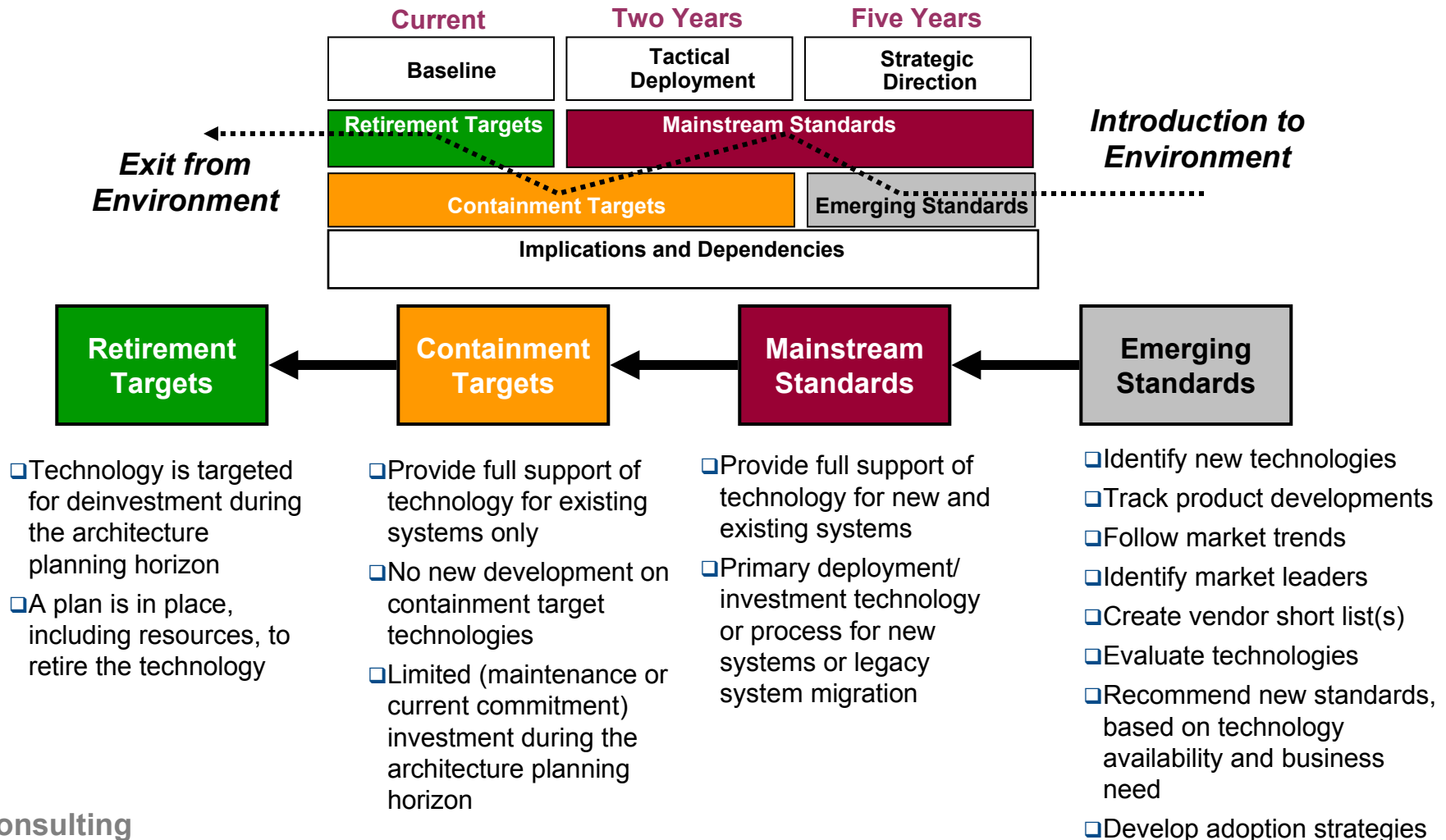
Domains	Domain Strategies
1. Presentation Services	Presentation services will exploit the use of widely available technology to provide a collaborative environment for facilitating user access to applications and services.
2. Communication Services	Develop and maintain a reliable core communication services infrastructure with mechanisms to facilitate timely problem resolution in the event of an outage, congestion, or other problem. The State will have a common network architecture for voice, video and data. These networks may or may not be converged depending upon the economics of the networks. The networks will use standard Internet protocols.
3. Security	Provide a standards based security framework that supports a statewide policy to ensure the confidentiality, integrity and availability of information and information systems.
4. Computing Services	The computing platforms will be driven towards a limited number of standards that provide for economies of scale in operations and acquisition while still providing enough choice to insure competition and flexible of choice features for the State.
5. Enterprise Applications	The State shall adopt a set of applications that will be used as either common or shared applications. COTS will be preferred for solution acquisition. A common portal will be used to host access to all e-government initiatives. A limited number of application development environments will be supported. This will include applications that are developed by third parties under contract to the State.
6. Systems Management Services	Provide a common framework of Systems Management standards, products and services within a defined architecture for each agency IT operations group, to manage its Information Technology infrastructure and applications.

Executive Summary (Cont'd)

Architecture Governance

Evergreening the IT Architecture

Technology standards must be updated (i.e., made “evergreen”) regularly (e.g., annually). An IT architecture must allow a variety of alternative standards to apply to different types of work.



Executive Summary (Cont'd)

“Evergreening” Process

Bottom Line

Success means the architecture is being complied with. If not, the value of creating one is diminished and the credibility of the IT organization suffers.

Crucial Factor

If the business is not behind it, it will fall apart.



Recommendations for the CIO Office

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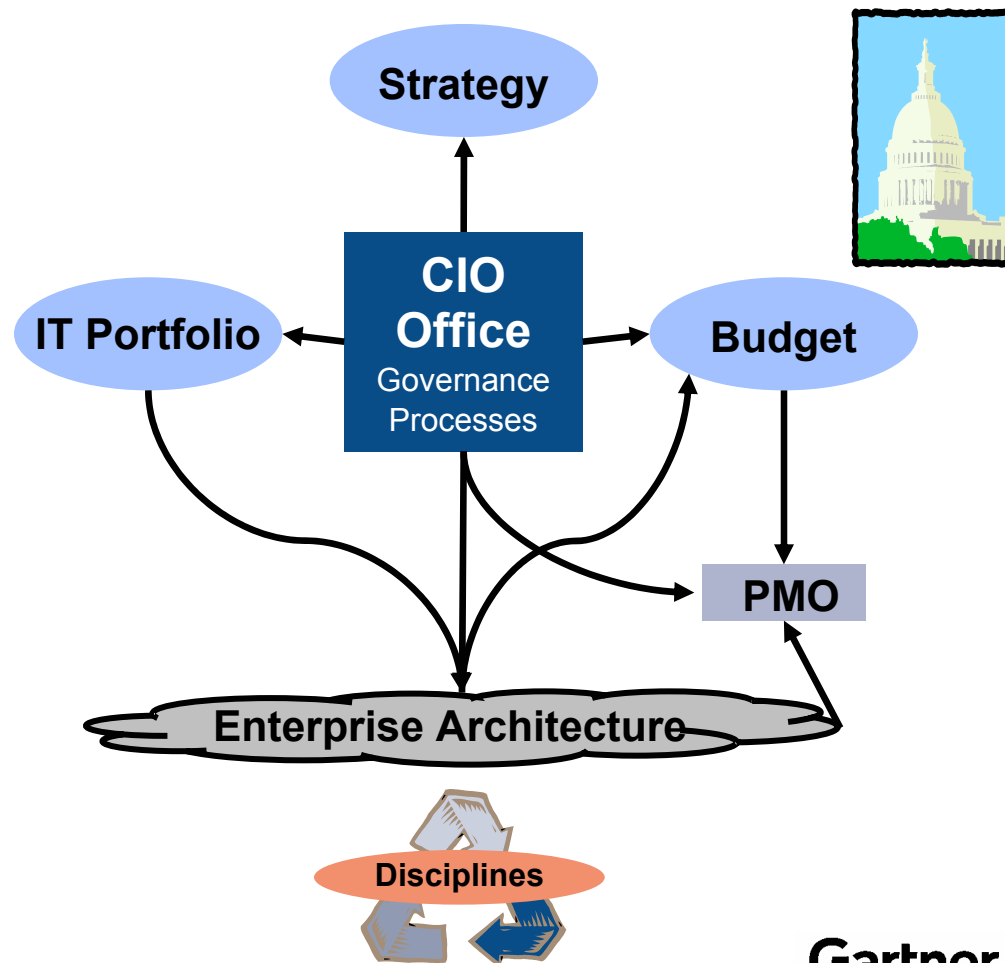
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Recommendations for the CIO Office—Summary

CIO Office/Enterprise Architecture (EA) Directions

Based on the State/agencies' feedback, interviews and industry best practices, we have identified the following recommendations to be the most important for the CIO's office for the successful implementation and on-going maintenance of the State's IT Architecture:

1. Refine Enterprise Architecture
2. Expand Enterprise Architecture
3. Integrate Enterprise Architecture with Project and Portfolio Analysis
4. Develop Communication Plan
5. Develop EA processes to Support PMO
6. Integration with Procurement
7. Establish Configuration and Certification Process for new Disciplines
8. Define Process Standards- Select for Guidance

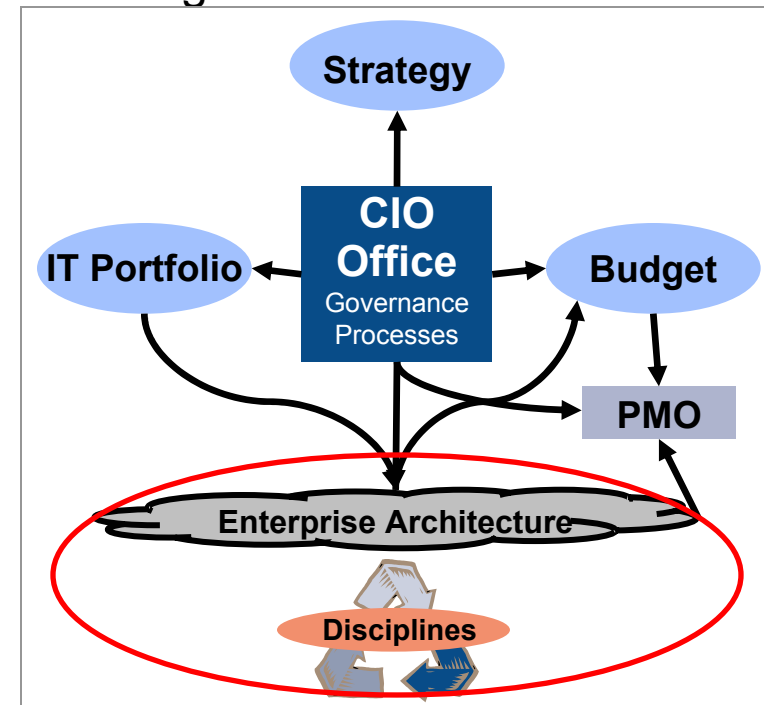


Recommendations for the CIO Office—Details

CIO Office/Enterprise Architecture (EA) Directions

1. Refine Enterprise Architecture

- ❑ **New Baseline:** The current baseline will be 1-year old in February 2004 and would have covered only a selected set of agencies and the original 48 disciplines. A new baseline based on the prior baseline and work conducted in the domain workshops should be conducted. The new baseline should include the refined disciplines and be extended to additional agencies.
- ❑ **Refine Research:** Each discipline should be reviewed and the research basis of the discipline needs to be refined periodically. This would include the CIO office providing research to the Domain owners.
- ❑ **Name Discipline Owners:** Ensure that the each of the disciplines has owners appointed by its respective domain committees.

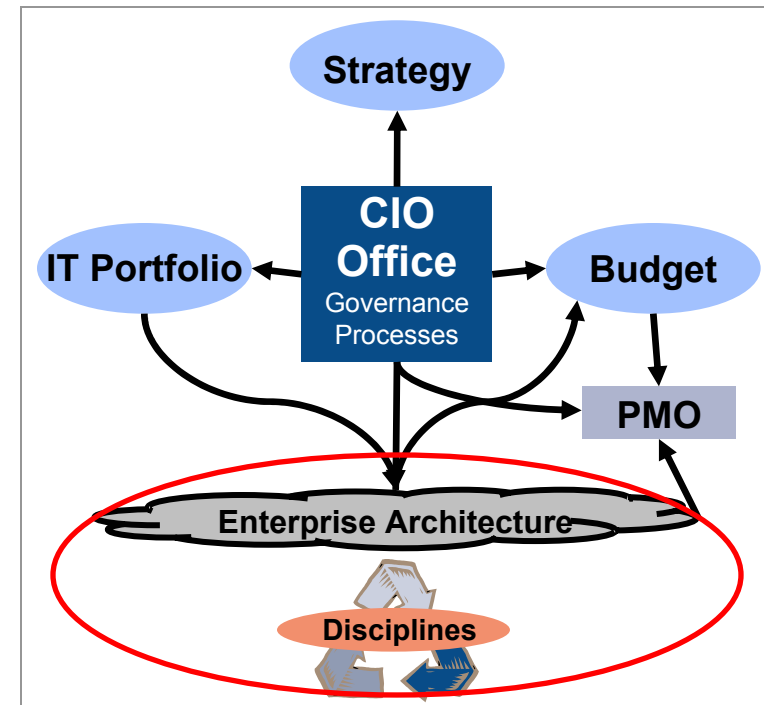


Recommendations for the CIO Office—Details (Cont'd)

CIO Office/Enterprise Architecture (EA) Directions

2. Expand Enterprise Architecture

- ❑ **Add Patterns (See Appendix A for details on Patterns):** Once the baseline for the State architecture has been adopted, e.g. the AOC has approved/accepted the initial work of the domain teams, the State should begin to add reference blueprints (technology solution patterns) to the EA.
- ❑ Patterns provide a “where” to use model for the disciplines and will help prevent the inappropriate use of disciplines.

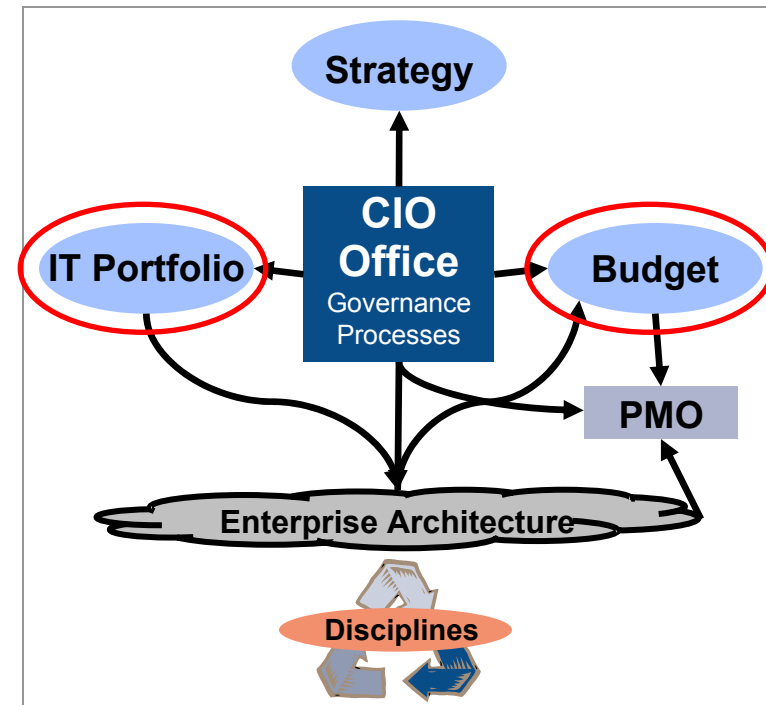


Recommendations for the CIO Office—Details (Cont'd)

CIO Office/Enterprise Architecture (EA) Directions

3. Integrate Enterprise Architecture with Project and Portfolio Analysis

- ❑ **New Projects:** Create processes to insure that the EA is used by the Budget Planning Process to assess the architecture compliance and risk of proposed IT project.
- ❑ **Existing Project Portfolio:** In addition, the State should establish processes that periodically review the performance of the existing portfolio of IT infrastructure and application systems in use within the State. The result of this performance portfolio process should provide direction to the EA domains as to where the EA needs to be reviewed/changed.

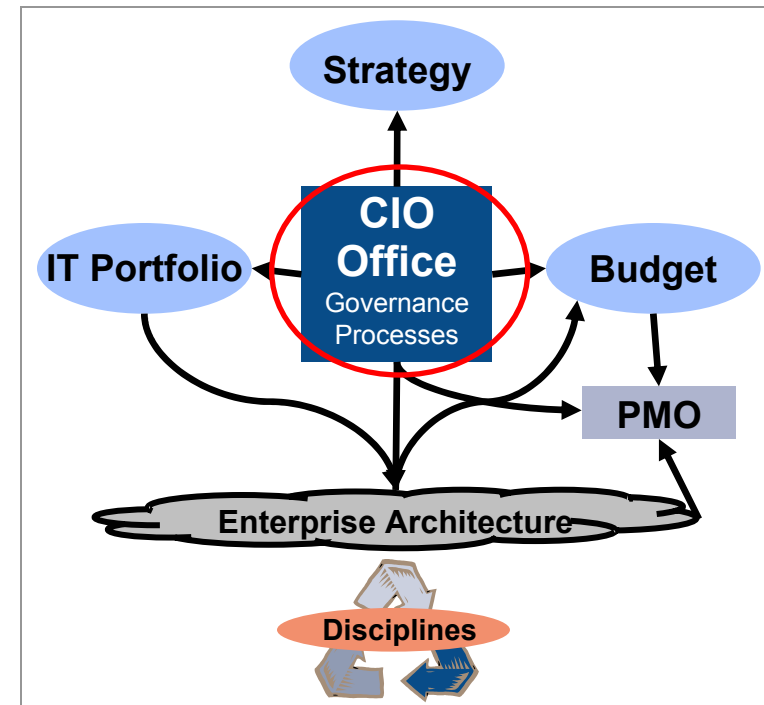


Recommendations for the CIO Office—Details (Cont'd)

CIO Office/Enterprise Architecture (EA) Directions

4. Develop Communication Plan

- ❑ **Compliance with Enterprise Architecture:** Key to deriving value from the EA is the degree in which the EA is used throughout the State. A communication program supplemented with a compliance review process is key to leveraging the investment in IT through the use of Architecture discipline and blueprint patterns.

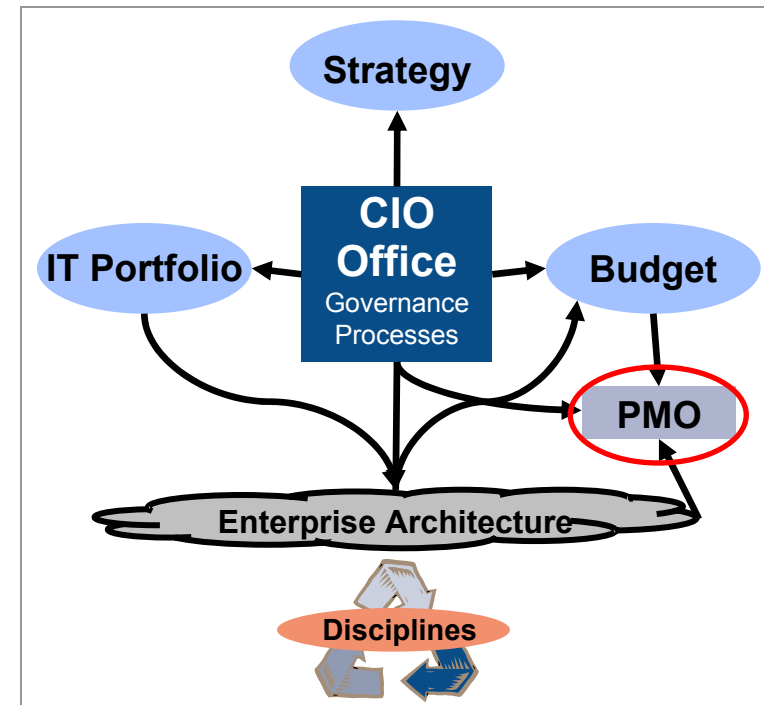


Recommendations for the CIO Office—Details (Cont'd)

CIO Office/Enterprise Architecture (EA) Directions

5. Develop EA processes to Support PMO

- ❑ **Support PMO with Enterprise Architecture:** The PMO and various IT project teams throughout the State need to use the defined State EA but more importantly use the domain teams to confirm the architectural directions of their proposed solutions. The project template for the state needs to include the appropriate EA review points for IT projects.
- ❑ Typically, these touch points are:
 - Preliminary project architecture review conducted at the beginnings of the project
 - A formal architecture review conducted at the end of design and prior to construction phase and,
 - Finally a final review conducted after the project is placed in services.



Recommendations for the CIO Office—Details (Cont'd)

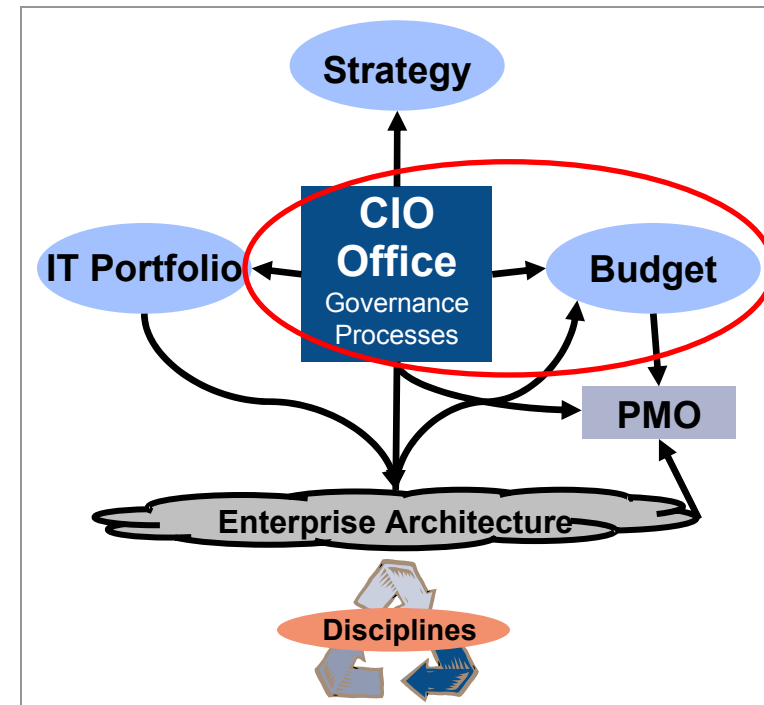
CIO Office/Enterprise Architecture (EA) Directions

6. Integration with Procurement

- ❑ A key safeguard to the inadvertent violation of architecture standards is the coordination of the architecture and procurement teams. The architecture team should supply the procurement team with the approved products/slides defined in the State architecture.

In addition, the procurement team and the architecture team should work closely together to publish the standard configurations and approved vendors for Statewide procurement.

- ❑ **Domain teams** should establish and maintain the standard configurations for Statewide procurement.
- ❑ The **procurement team** should require architectural approval on all major IT purchases.



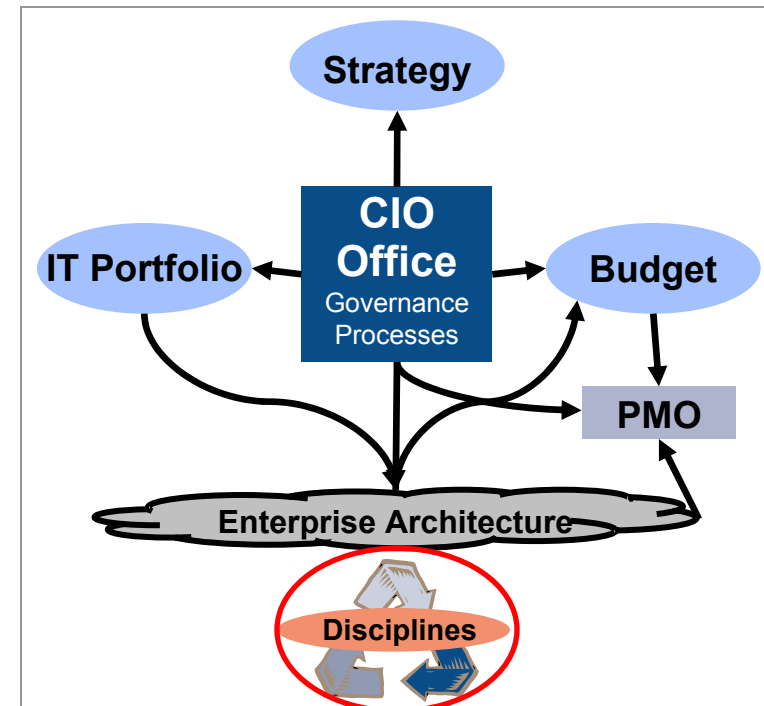
Recommendations for the CIO Office—Details (Cont'd)

CIO Office/Enterprise Architecture (EA) Directions

7. Establish Configuration and Certification Process for new Disciplines (or new technologies within Disciplines)

- ❑ Desktop -- to Win XP
- ❑ Routers
- ❑ As new or replacement technologies are added to each discipline, each domain team should determine whether or not a standard configuration or certification is required.

The purpose of the Configuration and Certification process is to provide guidance and a safe mode for the deployment of technology. In addition, these configurations should be the required stopping mode for new acquisitions. See recommendation # 6.



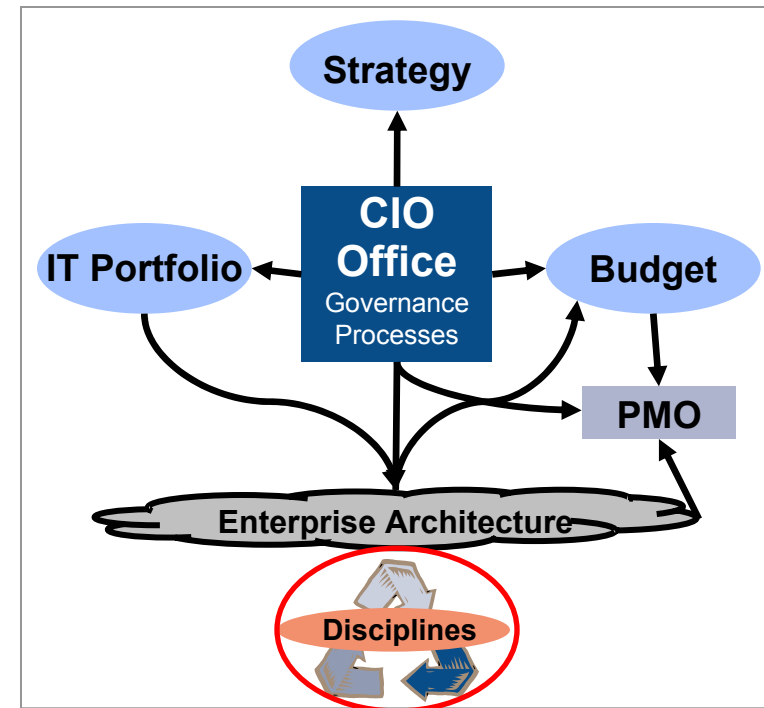
Recommendations for the CIO Office—Details (Cont'd)

CIO Office/Enterprise Architecture (EA) Directions

8. Define Process Standards- Select for Guidance

- ❑ ITIL (ISO 15000)—Enterprise System Management
- ❑ PC Guidance—Desktop minimums, Refresh Cycles etc
- ❑ Section 508—Accessibility Standards
- ❑ State Technology Standards—Network/ Documents etc.
- ❑ ISO 17799 Security Policy

The CIO Office needs to establish the standards for various IT processes. The above list of standards is only provided as an example of the types of standards that should be used as principles/standards/guidelines for the domains and disciplines. Each domain area should review the existing state standards and insure that the domain and standards are synchronized. In addition, where the state architecture needs to provide guidance, e.g. PC Guidance, each domain team needs to establish the Guidance document and a refresh cycle.





Short-Term Actions

Short-term Actions For the CIO's Office

1. Complete Version I
2. Publish ESM & Security Policies
3. Initiate baseline for Version II
4. Create Project Review Process
5. Establish Purchasing process

We recommend the following short-term actions for the CIO's office:

1. Complete Version I of all the Domains
2. Write/Publish Enterprise Support Management (ESM) and Security Policies
3. Initiate new Baseline for Version II
4. Create Major Project/Architectural Review Process
5. Establish Purchasing Processes—Establish Guidelines/Standards

Short-term Actions (Cont'd)

1. Complete Version I
2. Publish ESM & Security Policies
3. Initiate baseline for Version II
4. Create Project Review Process
5. Establish Purchasing process

1. Complete Version I of All the Domains

- ☐ Publish the Version I taxonomy
- ☐ Publish Version I standards, products and vendors
- ☐ Complete naming discipline owners for the Version I effort
- ☐ Establish schedule for Version II

2. Write/Publish Enterprise Support Management (ESM) and Security Policies

- ☐ Create a library of all policies and standards
- ☐ Establish State ESM Guidance Document
- ☐ Publish State Desktop/Laptop Standards and Roadmap

Short-term Actions (Cont'd)

1. Complete Version I
2. Publish ESM & Security Policies
3. Initiate baseline for Version II
4. Create Project Review Process
5. Establish Purchasing process

3. Initiate New Baseline for Version II

- Add and retire Disciplines to Version 1
- Review and revise Version 1 Domains
- Add additional Agencies to the EA baseline

4. Create Major Project/ Architectural Review Process

- Establish a process to conduct architectural review of projects conducted by Internal and External Service Provider (ESP) Development
- Develop PMO and architecture support for projects within the PMO
Actions:
 - Develop the Process
 - Inventory of existing projects
 - Architectural review of ongoing projects

Short-term Actions (Cont'd)

1. Complete Version I
2. Publish ESM & Security Policies
3. Initiate baseline for Version II
4. Create Project Review Process
5. Establish Purchasing process

5. Establish Purchasing Process— Establish Guidelines/Standards

- ❑ Publish the PC/laptop standards and replacement cycle guidelines
- ❑ Distribute approved list of products that can be used to provision the architecture to the Procurement Office



Discipline Status

1. Presentation Services
2. Communication Services
3. Security
4. Computing Services
5. Enterprise Applications
6. Systems Management Services

1. Presentation Services Domain

Roadmap Notes

Discipline	Status*	Recommendations
Desktop Hardware	WIP	<ul style="list-style-type: none">– State to establish best buying practices and vendors for PC & Laptop purchases.– Minimum PC standards need to be established to identify PCs that should be slated for retirement/replacement – this will be done annually
Laptop Hardware	WIP	<ul style="list-style-type: none">– All laptops must be Win 2000+ compatible. Tablet PC-need to review test programs and decide if standard is needed - State to establish best buying practices and vendors for PC & Laptop purchases.– Minimum PC standards need to be established to identify laptops that should be slated for retirement/replacement – this will be done annually
Client Operating Systems	WIP	<ul style="list-style-type: none">– Note Win XP=Professional Version– Need to determine the State overhang with old versions of O/S – An action item for the Domain team
Dumb Terminals	WIP	<ul style="list-style-type: none">– Citrix – Domain team needs to identify where Citrix is being used and evaluate the operations and cost of these deployments.
PDA's	WIP	<ul style="list-style-type: none">– Need research into who and where personnel devices are being used.

Note: New- Added Discipline during the workshop, **WIP**-Additional work needs to be done, **Completed**-Completed until next review cycle or an exception is requested

1. Presentation Services Domain (Cont'd)

Roadmap Notes

Discipline	Status*	Recommendations
Desktop Productivity Tools	WIP	<ul style="list-style-type: none">– Needs to be reviewed by Domain team and new baseline needs to be established. –– Conduct with O/S overhang review
Web Accessibility	WIP	<ul style="list-style-type: none">– The LIFT Software is used to “read” an agency’s Web pages and to identify content and design features that do not meet the W3C Web Content Accessibility Guidelines. The Software provides an error listing and instructions for correcting each deficiency.– Each agency should perform an annual 508 evaluation of its web sites.
Assistive Technology	New	
File Formats	New	

Note: New- Added Discipline during the workshop, **WIP**-Additional work needs to be done, **Completed**-Completed until next review cycle or an exception is requested

2. Communication Services Domain

Roadmap Notes

Discipline	Status*	Recommendations
WAN/LAN Protocols	WIP	<ul style="list-style-type: none">– Curtain SNA investments.– Need LAN protocol plan.
Hardware— Switches & Routers	Completed	
Remote Access Methods & Clients	WIP	<ul style="list-style-type: none">– Need to establish architecture for the four remote access methods (Direct dial access, managed services, Ipsec VPNs and Web Portal access).
LAN Topologies	Completed	
LAN Wiring	WIP	<ul style="list-style-type: none">– Need for LAN spec template
Wireless Data Communications	Completed	
Enterprise Telecommunications (Voice/Video)	Completed	

Note: New- Added Discipline during the workshop, **WIP**-Additional work needs to be done, **Completed**-Completed until next review cycle or an exception is requested

2. Communication Services Domain (Cont'd)

Roadmap Notes

Discipline	Status*	Recommendations
Directory, Network OS and Support SW	WIP	– Need to develop a roadmap—Identify the need for an integrated directory solution.
Email Services	WIP	– Need web access
Unified Messaging	New	

Note: New- Added Discipline during the workshop, **WIP-**Additional work needs to be done, **Completed-**Completed until next review cycle or an exception is requested

3. Security Domain

Roadmap Notes

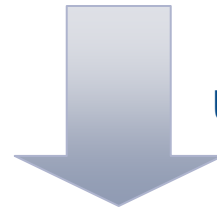
Discipline	Status*	Recommendations
Forensic Tools	WIP	– Please see the proposed Security Taxonomy in the next page.
Intrusion Detection	WIP	– Please see the proposed Security Taxonomy in the next page.
User Administration	WIP	– Please see the proposed Security Taxonomy in the next page.
Policy & Practice	WIP	– Please see the proposed Security Taxonomy in the next page.
Access Control	WIP	– Please see the proposed Security Taxonomy in the next page.
e-Mail	WIP	– Please see the proposed Security Taxonomy in the next page.
Virus Protection	WIP	– Please see the proposed Security Taxonomy in the next page.

Note: New- Added Discipline during the workshop, **WIP**-Additional work needs to be done, **Completed**-Completed until next review cycle or an exception is requested

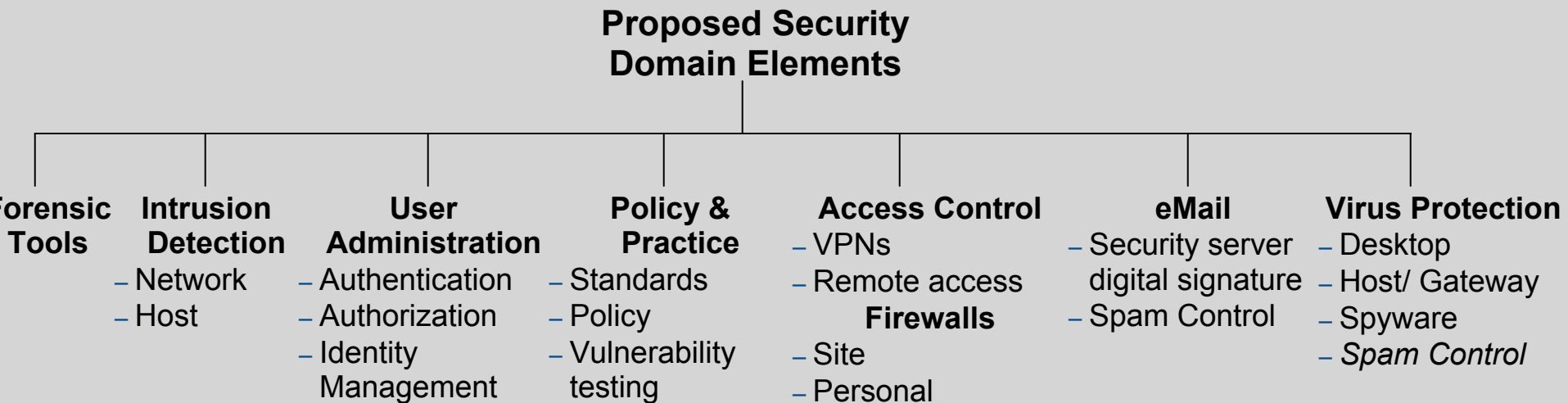
3. Security Domain (Cont'd)

Updated Security Taxonomy

DISCIPLINES



Updated during the workshop



4. Computing Services Domain

Roadmap Notes

Discipline	Status*	Recommendations
Mainframe Hardware & OS	WIP	<ul style="list-style-type: none"> – Form group to establish Open VMS/Unisys strategy. – Need Unix/Linux alternative. – Need an Open VMS Strategy
Mainframe Development Tools	Completed	
Mainframe dB/File Manager	Completed	
Middleware	WIP	<ul style="list-style-type: none"> – Keep middleware on radar for future.
Mid-tier Server Hardware & OS	WIP	<ul style="list-style-type: none"> – Need to retire W2K - from the architecture.
Application Server Development (A/D) Tools	Completed	
Mid-tier dB/File Manager	Completed	
Web Server OS	WIP	<ul style="list-style-type: none"> – Computing Services Domain committee should determine whether IIS need to be supported by the “centralized” office (CIO)?

Note: New- Added Discipline during the workshop, **WIP**-Additional work needs to be done, **Completed**-Completed until next review cycle or an exception is requested

4. Computing Services Domain (Cont'd)

Roadmap Notes

Discipline	Status*	Recommendations
Web Server Development Tools	WIP	– Obtain a more complete baseline from all the agencies.
Web Server dB/File Manager	WIP	– Remove from architecture ASAP. Retire the discipline.
Storage Subsystem— DASD/ SAN	Completed	
Storage Subsystem— Tape Storage	Completed	
Mid-tier Storage, Backup/ Archival SW & CD	Completed	

Note: New- Added Discipline during the workshop, **WIP-**Additional work needs to be done, **Completed-**Completed until next review cycle or an exception is requested

5. Enterprise Applications Domain

Roadmap Notes

Discipline	Status*	Recommendations
Geographic Information Systems (GIS)	WIP	<ul style="list-style-type: none"> – Need to have the State's GIS architecture defined – Establish an agency level architecture
Customer Relationship management (CRM)	WIP	<ul style="list-style-type: none"> – Need to identify the State's CRM needs – Evaluate the CRM tools currently being used within agencies.
Enterprise Resource Planning (ERP)	Completed	
Business Intelligence (BI)	WIP	<ul style="list-style-type: none"> – Pick a set of BI tools that the State will utilize.
Supply Chain Management (SCM)	WIP	<ul style="list-style-type: none"> – Need to identify the State's SCM needs
Web Commerce	WIP	<ul style="list-style-type: none"> – This discipline will be jointly owned by the Enterprise Application domain and the Computing Domain. – Need to appoint discipline owners to represent both domains.
Document Management	WIP	<ul style="list-style-type: none"> – Need to find out what Document Management packages are utilized by various State agencies.

Note: New- Added Discipline during the workshop, **WIP**-Additional work needs to be done, **Completed**-Completed until next review cycle or an exception is requested

6. Systems Management Services Domain

Roadmap Notes

Discipline	Status*	Recommendations
Problem/Change/ Configuration Mgmt Tools	WIP	– Please see recommended System Management Services Taxonomy in the next page.
Performance Capacity Management Tools	WIP	– Please see recommended System Management Services Taxonomy in the next page.
Network/ Events Monitoring Tools	WIP	– Please see recommended System Management Services Taxonomy in the next page.
Software Distribution Tools	WIP	– Please see recommended System Management Services Taxonomy in the next page.
End User Support Tools	WIP	– Please see recommended System Management Services Taxonomy in the next page.
Asset Management	WIP	– Please see recommended System Management Services Taxonomy in the next page.

Note: New- Added Discipline during the workshop, **WIP**-Additional work needs to be done, **Completed**-Completed until next review cycle or an exception is requested

6. Systems Management Services Domain (Cont'd)

Recommended System Management Services Taxonomy

Discipline	Sub-Discipline	Discipline Scope	Old Discipline
System Management		Management and Control of all elements within the SC IT environment	
	Help Desk/Consolidated Service Desk	User and Device event management	Problem/Change management Management
	Asset Management	IT asset tracking	new
	Service Management Framework	What are the Std IT processes	new
Network Management		Management, configuration of the operations of the Network	
	Network Management System		new
	LAN Management	Device Managment - Routers/hubs/switches-configuration/performance/fault detection	Network Event Monitoring
	WAN Management	Device Management - Configuration/performance	Network Event Monitoring
	Voice Management	Call Accounting Recording	new
Servers Management		Management, configuration of the operations of Servers	
	System Management Tools	Overall tool for monitor the operation of all of the servers	Configuration Management
	Patch Management	Tools for distributing software changes to the O/S	Software Distribution
	Server Monitoring	Tools for monitoring and configuring individual servers	Performance and Capacity Planning
	Server Backup and Recovery	Technology to backup servers	New
Desktop Management		Management of all desktops and network connected laptops	
	Configuration Management	Tools for imaging new desktops and laptops	Software Distribution
	Patch Mgmnt	Tools for distributing new releases for O/S and application software	End User Support
	Remote Control	Tools to allow the helpdesk to diagnostic and fix desktop problems	End User Support

A Note of Caution...

“IT architecture is a journey, not an event. The process that will be launched at the State is expected to generate significant long-term benefit to the business community; however, this process will take time and effort by all stakeholders before the results are felt by the Statewide enterprise. Management must remember that there are no silver bullets in IT. Business benefits will be incremental, not big bang.”



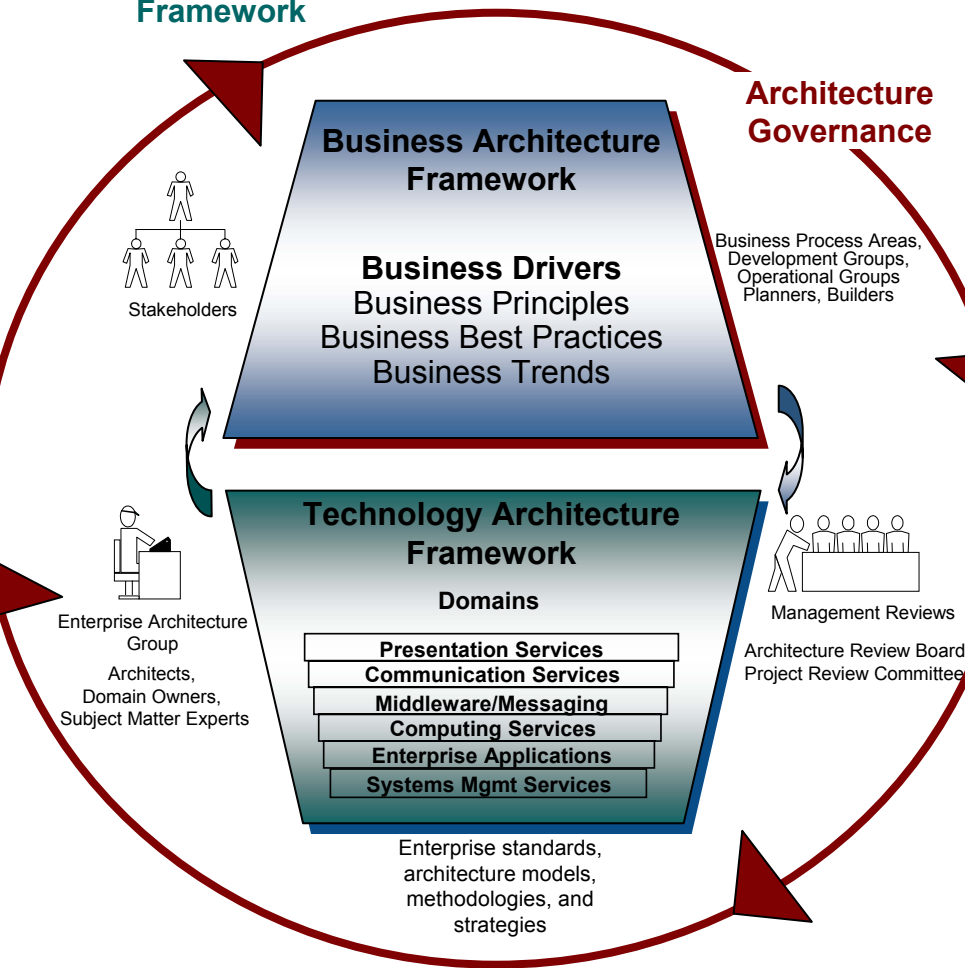
Appendices

Enterprise Architecture Framework
Technology Solutions Patterns
Glossary of Terminology

Enterprise Architecture Framework

Details

Enterprise Architecture Framework

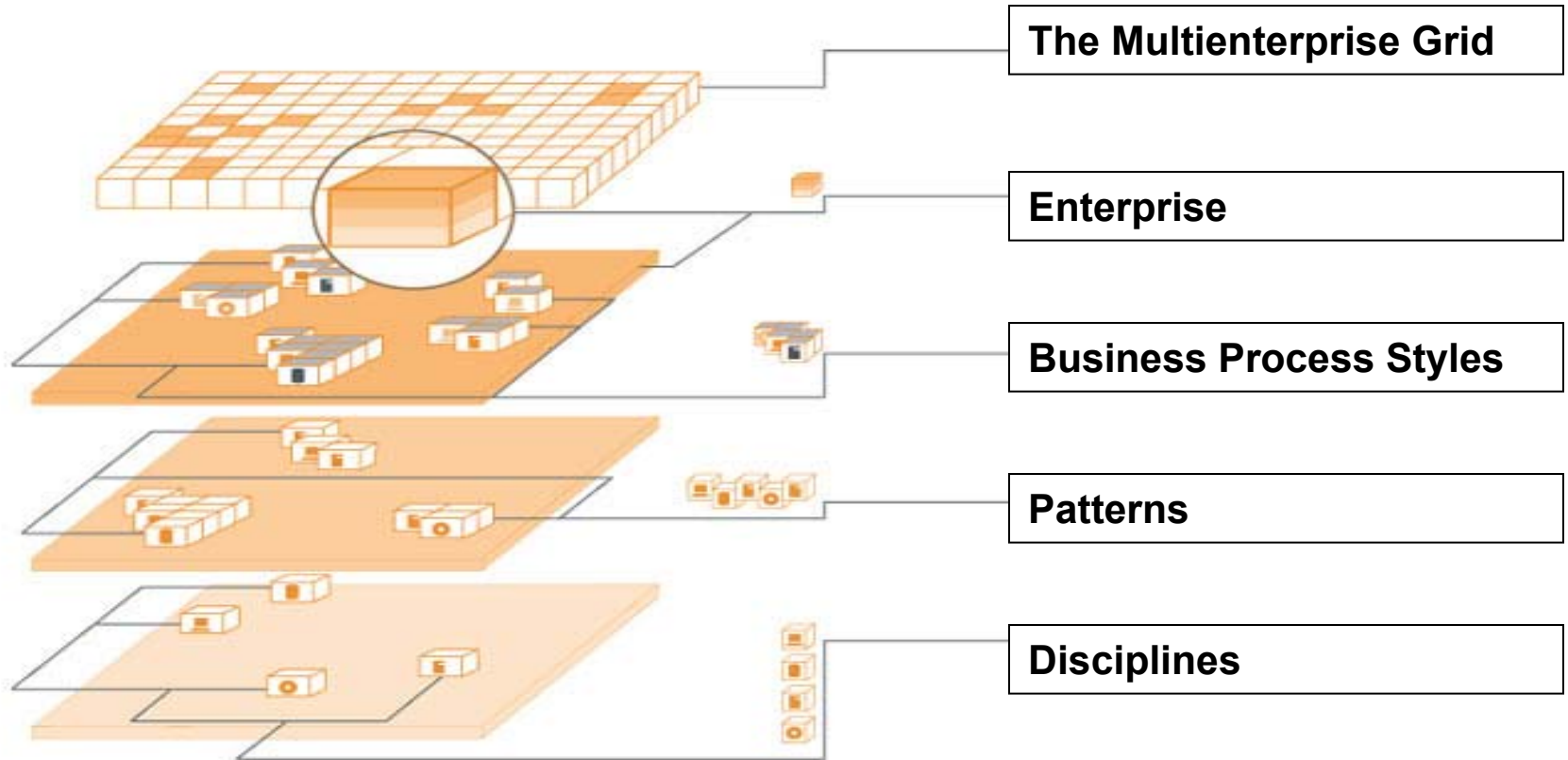


- The pace of change in today's enterprise often renders the IT architectural document obsolete before the ink has dried. A more dynamic organizational approach can integrate business and information technology (IT) architectures on a continuous basis.
- An enterprise architecture:
 - Captures facts about the business in an understandable manner to enable better decision-making
 - Improves communication between the IT organization and the business units
 - Reduces the risk of building systems that do not meet business needs
 - Eliminates false starts
 - Provides a decision support tool to the IT planning, management and development processes
 - Highlights opportunities for building greater quality and flexibility into applications without increasing the cost.
- The broader the scope of the architecture across the enterprise and the deeper its levels of detail, the greater the potential benefit.

Technology Solutions Patterns

The New Enterprise Architecture Framework

- **Key Issue: What new architecture models are available to achieve dynamic business linkage?**



Technology Solutions Patterns (Cont'd)

The New Enterprise Architecture Framework (Cont'd)

- **Key Issue: What new architecture models are available to achieve dynamic business linkage?**
- The Grid is the highest-level operating environment for technology worldwide and includes all the enterprises that exist within a dynamic state of constant connectivity internally and with each other. Within the grid, a variety of different networks are able to communicate securely through an established array of multi-functional information exchange features. The enterprise operates through the execution of a series of many business processes to carry out business objectives. Business processes may be supported through a variety of IT applications and services.
- All of the business processes may be grouped into several categories that have similar requirements - called Business Process Styles. Each of the Business Styles leads to an Architectural Style for optimal support.
- Patterns are groupings and design arrangements of Disciplines that have been created to achieve optimal results. The patterns themselves are a common vocabulary of templates for use by designers and developers..
- Disciplines are the core technology building blocks that describe technological architectural elements at their lowest component level, to provide base technology functions. Examples of Disciplines are operating systems and databases.

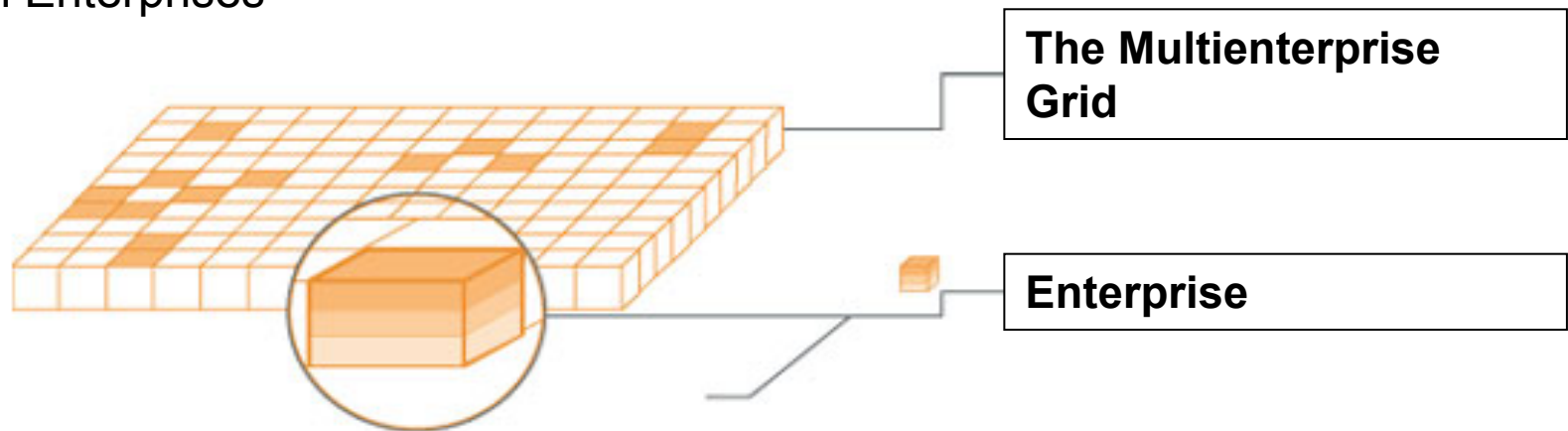
Technology Solutions Patterns (Cont'd)

The New Enterprise to Enterprise Grid

- The Multienterprise Grid provides a major new capability of enterprise to enterprise information exchange.

Components:

- Enterprises
- Virtual Enterprises



Features:

- New Capabilities for Information Exchange

Technology Solutions Patterns (Cont'd)

The New Enterprise to Enterprise Grid (Cont'd)

- The Multienterprise Grid provides a major new capability of enterprise to enterprise information exchange. The component elements in this top level are all the enterprises and all the virtual enterprises that need to communicate with each other. Naturally enterprises have been communicating with each other since the beginning of commerce, but largely because of the advances of technology, the potential for taking advantage of a more intense information exchange is growing as fast as we can imagine it. Globalization of commerce has changed the world in many ways - and it largely came about through the advances of telephony, satellites, etc. with great bandwidth enabling data entry clerks in Ghana to process traffic tickets from New York City - and engage in many other forms of trade and commerce. From fax to soft-copy over the Internet, the issue of distance has evaporated from an information viewpoint. We are no longer restricted by cables or Telex that used to be the boundaries of international communications.
- It is exactly this kind of communications expansion that will produce the equivalent of radically new services and structures - to the point that enterprises will buy or outsource a variety of tasks to others - via the grid - and concentrate on the value-adding competence where it supplies a superior product or service. From routine credit card authorizations to a focus on customer experience via information intimacy, a new horizon of information exchange will deliver better results.

Technology Solutions Patterns (Cont'd)

The Enterprise Consists of Business Processes

Components:

- ❑ Enterprise Value Chain
- ❑ Business Processes
- ❑ Business Process Styles



Features:

- ## Business Processes Enabled by IT Applications

Technology Solutions Patterns (Cont'd)

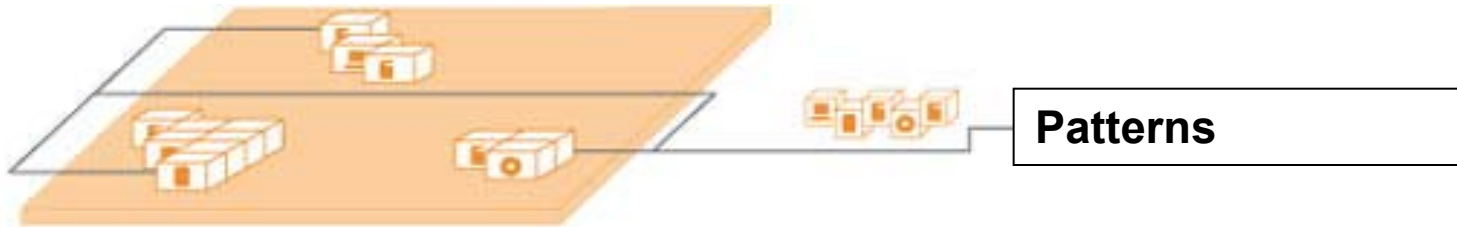
The Enterprise Consists of Business Processes (Cont'd)

- This level or plane represents one component residing in the higher or grid plane - that is, one enterprise or virtual enterprise (a virtual enterprise is two or more enterprises acting together as if they were virtually one). Each individual enterprise can generally be described as having its own value chain - the manner in which it adds value to commerce or society. The value chain is at the highest possible level of functionality from which each link in the chain can then be broken into a series of business processes. Those processes then carry out certain organized tasks which finally can be broken down into various activities.
- But the different business processes can be divided into a few convenient classes based upon common characteristics which derive from the nature of their tasks and activities - e.g. fast response vs.. careful analysis. These different classes of business processes we call business process styles. Each of these business process styles can then be supported by various applications to perform the relevant tasks. The applications are designed in a corresponding architectural style to provide the best use of IT resources to fulfill the particular business need. If a need for collaboration involved video transmission for example, a focus on efficient delivery of bandwidth would be provided but without the need for sophisticated error correction capabilities.

Technology Solutions Patterns (Cont'd)

Components:

- ❑ Business Process Applications
- ❑ Logical Design Patterns
 - Applications
 - Systems
 - Information



Features:

- ❑ Patterns provide design guidance
 - Two- to three-tier client/server
 - Service-oriented architecture
 - Data warehouse

Technology Solutions Patterns (Cont'd)

Business Process Applications Benefit Design Patterns (Cont'd)

- While the prior level focused on the business processes and their styles, this third level of the framework represents the use of design patterns. A pattern is a refined type of guideline or sometimes a 'reference model' to employ as the ideal. A variety of established patterns are available to implement the design of an individual application within the appropriate architectural style. The pattern can be used again and again - with the corresponding skill gaining from experience. To continue the collaboration application example of a business process style, the pattern to be employed might include a publish-and-subscribe model. Such a pattern can fulfill the requirement and set a degree of uniformity across the firm and be used repeatedly.
- Some other examples of patterns would include the two- or three-tier client/server model, the use of operational data stores, a centralized data warehouse, the design of an enterprise portal, and other patterns that may suit the world of networking, etc. Another type of pattern is the use of a service-oriented architecture (SOA), a consistent way to design and construct applications based upon principles of object orientation.
- Within each of the patterns the elements that are used to create the patterns are the base building blocks or Disciplines. The Disciplines can be assembled in an infinite variety in order to create patterns that in turn perform a series of tasks or a process in a manner suited to the architectural style being supported.

Design Patterns are Implemented with Disciplines

- Hardware
- Software
- Interfaces



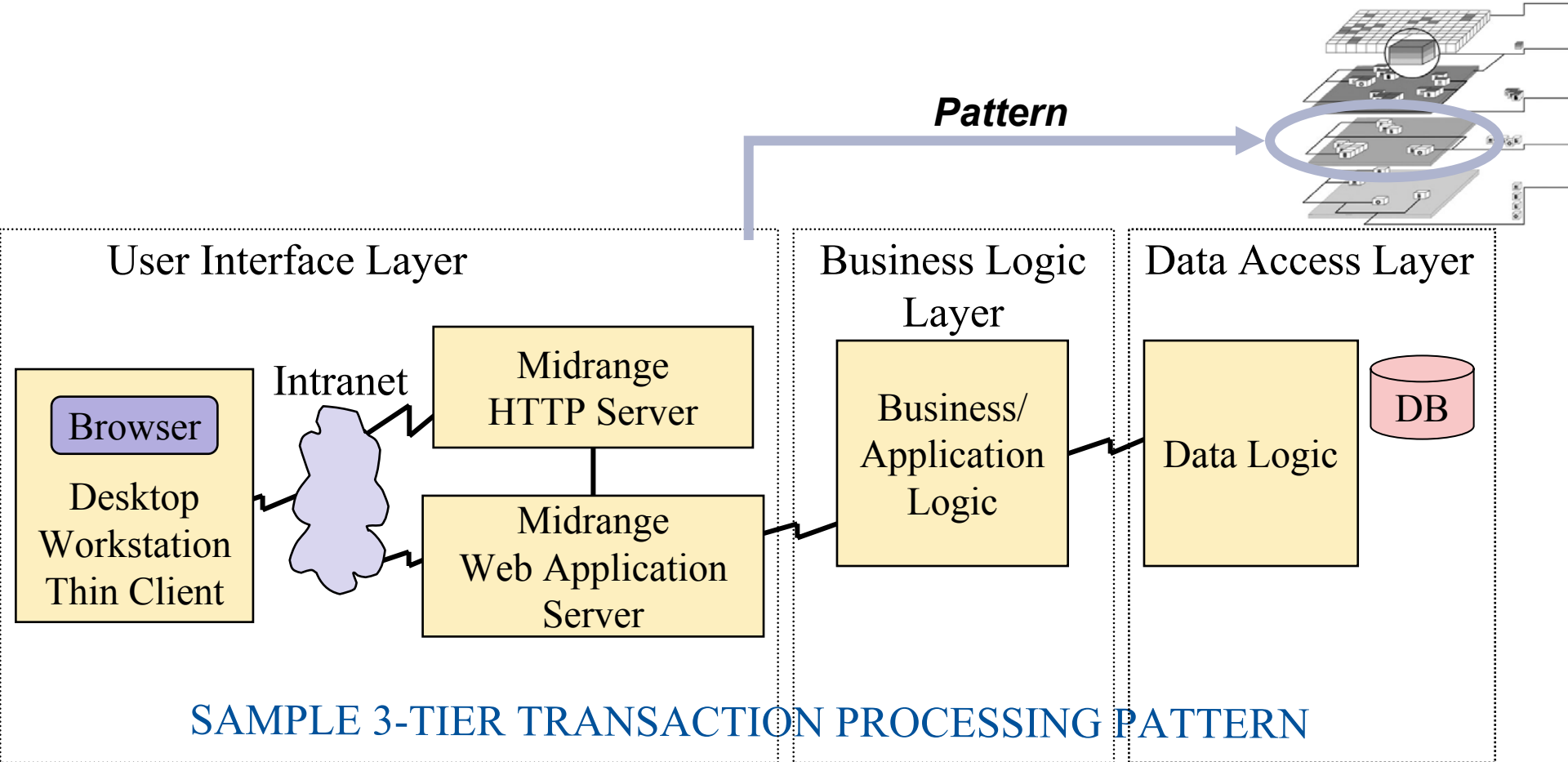
Technology Solutions Patterns (Cont'd)

Design Patterns are Implemented with Disciplines

- The final layer of the framework, the essential foundation consists of the raw building blocks or Disciplines which are chosen and assembled to implement a pattern. The Disciplines may be hardware elements such as servers and disk drives, or software such as databases, languages, and various aspects of middleware, or interfaces - whether different kinds of displays to humans or to other input/output devices. The breadth of coverage involving Disciplines is extensive and requires some categorization to be practical. One means of classification is the use of several domains, such as software infrastructure, and even sub-domains, such as network management - to help organize the types of Disciplines. Furthermore, Disciplines have some temporal properties that determine the current guidance regarding their use. These include the degree of maturity - such as emerging, mainstream, followed by containment and then retirement - although these classifications will vary from enterprise to enterprise.
- In any case it is the base level of the architecture that specifies the Disciplines available for application use. These are in turn selected and assembled into patterns, which support an architectural style in implementing an application to support a business process - which itself has a style. The business processes carry out functions in support of the value chain which defines the enterprise purpose or mission.

Technology Solutions Patterns (Cont'd)

Patterns are Block Diagrams of Ways to Implement Styles in Technology



More detail about implementation choices for the chosen standard set of patterns would then be reflected in what we call configurations. Examples: workstations, midrange application servers, enterprise application servers, firewalls and LANs.

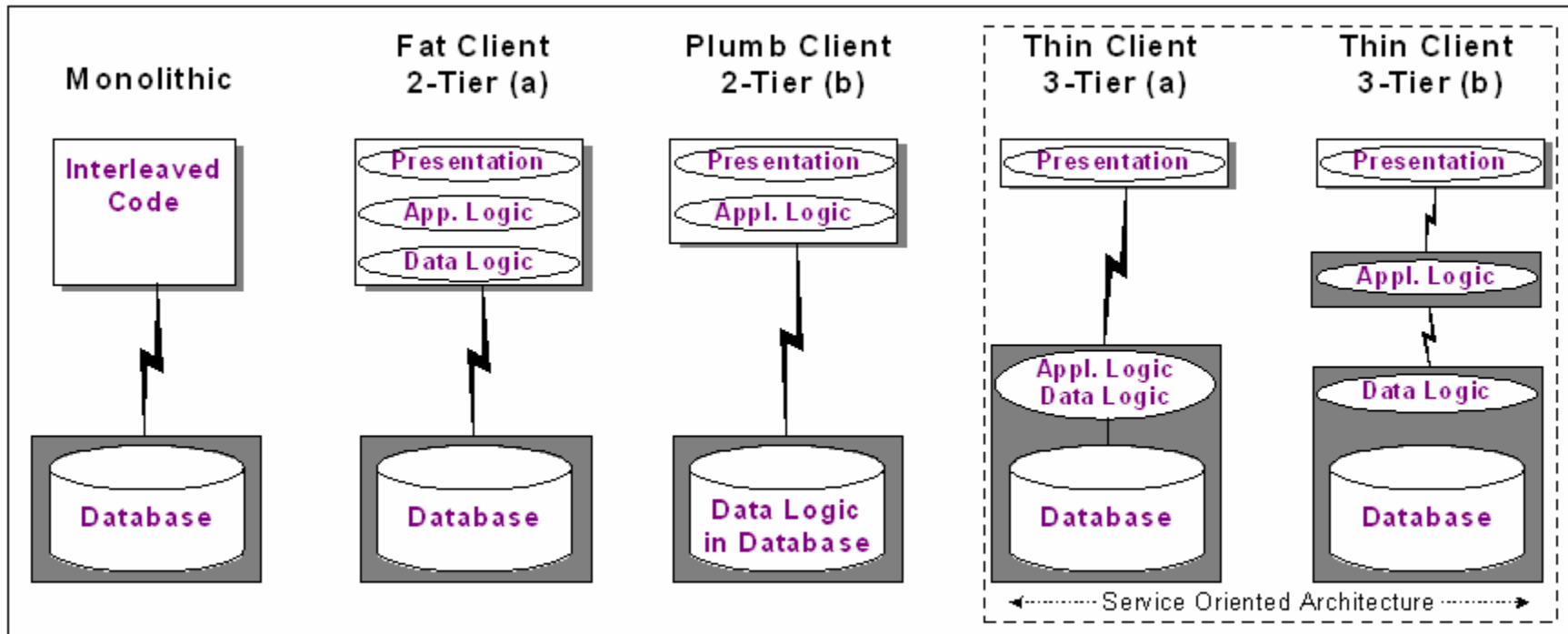
Technology Solutions Patterns (Cont'd)

Patterns are Block Diagrams of Ways to Implement Styles in Technology

- **What additional artifacts do you need to move your definitions from one layer to the next?**
- Design patterns describe models and algorithms that can be widely applied for different purposes in different enterprises. They are solutions to questions, such as "what is the best logical and physical topology of data, code, computers and networks?" Patterns reflect the inherent trade-off of design choices, such as distribution vs. centralization. They are analogous to architectural styles for buildings (such as ranch house vs. skyscraper) or parts of buildings (such as Doric vs. Ionic columns). Examples of patterns include: three-tier architecture, fat client/thin client, service-oriented architecture, data warehouse, message warehouse, operational data store, hub-and-spoke, snowflake, host-centric. There are many choices of patterns and variations, so it is a good idea to include a principle in your enterprise architecture planning process that limits the number of patterns to an agreed, standard set to be used.
- We have also found it useful to have the term "pattern" apply to a high-level block diagram, and then use the terms "configurations" and "models" to apply to the lower-level design diagrams. At the lower levels, we get to the detail of the products and standards actually used in the environment or to be used in our target environment; however, we use the approach of defining "Disciplines" to select them.

Familiar N-Tier Patterns

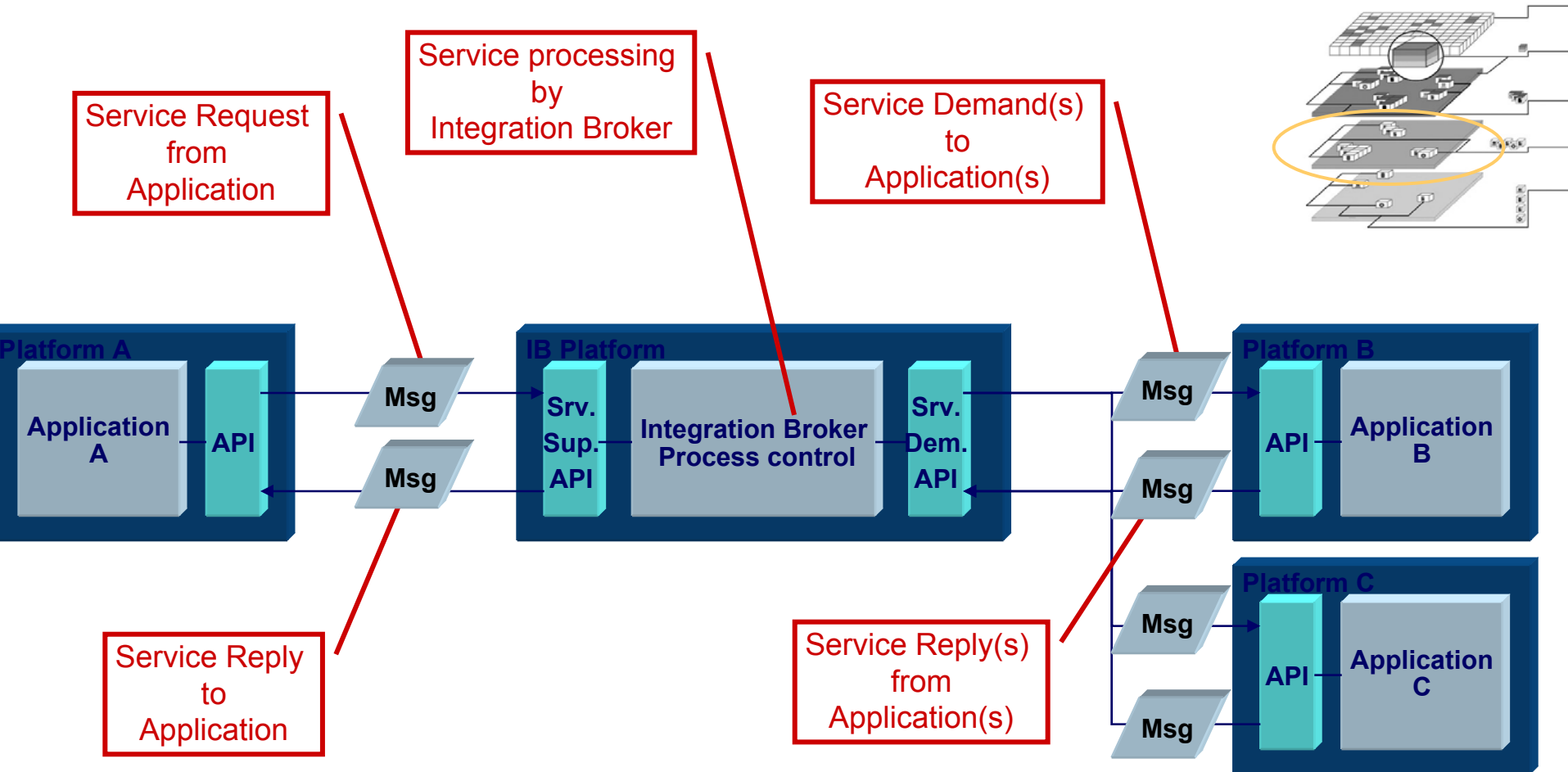
Pattern



Technology Solutions Patterns (Cont'd)

A Service Oriented Architecture Pattern

- Here is a general service oriented architecture.



Glossary of Terminology

- **"As-is" or "today" architecture:** A description of the information system(s) in place today — including conceptual, logical and physical aspects as they exist. This is often an inventory of applications, platforms and networks documented in a variety of ways. The choices that were made may have been planned or not; it is what you have.
- **"City planning":** Another relevant analogy to a construction industry plan that lays out a broad set of rules and policies that fit the relevant urban needs, but does not define how a particular building must be built. It fits the definition of guidelines, policies and rules.
- **"Next minute" architecture:** The collection of guidelines in the form of standards and processes to be followed when building new systems or capabilities. It includes reference models and practices that are intended to guide behavior during the design process. It becomes the method by which the transition is made from the as-is to the to-be. It is subject to regular change and updates.
- **"To-be" or "tomorrow" architecture:** A description of the system(s) that are targeted to be in place in the future. Often a vision may be described three years ahead. It should be based on fulfillment of the business strategy. The architecture may incorporate Web-enabled applications or consolidated data warehouses in intermediate detail. It may be used for the purpose of acting as a set of guidelines or design standards.
- **(U.S.) Federal Enterprise Architecture Framework (FEAF):** A jointly developed overall framework for enterprise architecture created within the federal government for shared use. First published in 1996 by the Federal CIO Council, it has been continually refined as the demand for architecture has grown and been mandated by legislation and regulation. The perspective fits that of as-is, to-be and standards and processes as guidelines. It also supports the general breakdown into business, data, application and technical architecture sectors. It now appears that the FEAF will be superseded by a set of more-detailed reference models published by the Office of Management and Budget Federal Enterprise Architecture Project Management Office (see www.omb.gov).
- **(U.S.) Treasury Enterprise Architecture Framework (TEAF):** The framework parallels the work done on the FEAF, but includes the particular computational demands that are critically important to U.S. Treasury operations and performance.
- **Application architecture:** Two views (see **architecture**): 1) A comprehensive description or design of an application, either established or planned (may include middleware options, data gateways and software infrastructures); or 2) the methodologies and processes, standards and design patterns to be followed in developing applications. Includes languages, means of gathering design requirements, coding styles, the use of reference models or patterns and quality assurance requirements. May also cover high-level concepts such as modularity, re-use or approaches to use in buying external applications packages.

Glossary of Terminology (Cont'd)

- **Architectural style:** A descriptive term to characterize some aspect of the architecture, such as modular, loosely coupled or flexible. May also be applied to the guidelines that are targeted to a particular set of computational needs, based on the business process style being supported (see **business processes, styles**).
- **Architecture "evergreening":** This refers to keeping the architecture "green" all of the time or applying practices and methods that constantly scan emerging technologies and needs, and evaluate them for insertion into the architecture so that it remains relevant and up to date.
- **Architecture capability maturity model:** A parallel to the use of the capability maturity model as applied to software development resources and others. The model can consist of five stages of maturity — starting out as an "infant" and progressing to an "adult" who had acquired productive wisdom. Each stage must be entered before progressing on to the next in the normal pattern. Its purpose is to assess where you are, where you would like to be, and the steps necessary to follow to attain the goal. In architecture, the starting point might be to decide to determine and publish standards, progressing past sophisticated business process modeling to the recognition and support of several architectural styles simultaneously to best serve the business strategies.
- **Architecture domains:** A descriptive means of dividing a major topic, such as architecture, into several cohesive subdivisions. In enterprise architecture, the most common use of high-level domains would include business architecture, information architecture and technical architecture. The latter two terms are further subdivided. Information architecture will be defined here as consisting of data architecture, application architecture, integration architecture and point-of-access architecture. Each domain focuses on performing functions to carry out the business purpose or tasks. The technical architecture consists of the infrastructure architecture, the security architecture and the system management architecture — each playing a major role in providing the base platform and services as a foundation for system performance.
- **Architecture life cycle:** Generally relates to the life cycle of an architectural component. It may first be supported as a new standard (*emerging technology* approved for selected use, then become *mainstream*, followed by *containment* — restricted to pre-existing use, and finally *retirement* or obsolescence, when the component is scheduled to be replaced. Each component may go through these life cycle stages over time within an architecture.

Glossary of Terminology (Cont'd)

- **Architecture model:** A representation of the real thing in another form. Each type of architecture can be modeled in some way. Business architecture is often represented in the form of process-control or information flow models. Applications can be represented in diagram form with activities and interfaces, in a timing-and-event sequence or in a verbal description. Information architecture can be represented by affinity diagrams, information flow maps and entity relationship models. Infrastructure architecture can be illustrated by a table of standards for various components. There are many options, but the goal is to clarify, make explicit and serve with the appropriate level of detail for the intended audience.
- **Architecture ownership:** Ownership means taking responsibility for or taking on the task of establishing a process, including governance, education, dissemination and compliance with the architecture. This is generally done by the information systems organization, with the direct support of the business units.
- **Architecture portfolio:** The use of the word "portfolio" implies categorization or classifying different elements into useful groups. An architecture portfolio can mean many things, such as grouping standards by type of technology, applications by business function or components by life cycle stage.
- **Architecture process:** Architecture is often referred to as a process, not a document — which is a valid description. Creating and maintaining an architecture is a continuing process that requires a series of activities, including: a statement of the relevant business goals and drivers for architecture, documentation of the current architecture, a view of the current and emerging technologies, creation of the target architecture, a governance process to select the appropriate standards and processes, a method to publish the guides and provide education, and a means to establish the measurement of compliance.
- **Architecture repository:** Repositories for architecture are gaining in relevance and use because of the difficulty of maintaining all of the multiple dimensions of architecture in an accessible manner. The best tools for this treat all the items as objects — including the application, the user, the devices, the location, the principles, the business activities, the vendors or products, and so on — so that one can select all of the items that may be associated with one factor. An example would be all of the applications that use a particular database. Several commercial products offer this capability.
- **Architecture return on investment (ROI):** This measure is often requested but difficult to satisfy. Studies indicate that operational costs are lower in enterprises with sound architecture programs, but it is difficult to isolate architecture as the causal force. If an architecture program is successfully in place, determining the equivalent costs if there were no architecture is hard to establish and, as a rule, not very credible. Nevertheless, many enterprises are convinced that the return or benefits compared to the cost are very attractive. The alternative to a financial ROI is to make a case through enumerating many specific results that are achieved from a successful architecture program.

Glossary of Terminology (Cont'd)

- **Architecture review:** At several possible stages of the creation of a new system or capability, it is appropriate to perform a review of the new design to determine whether it has been created in compliance with the architecture. This is often thought of as a "policing" task – to verify observation of the "law." Noncompliance may be handled in several ways — with the nonapproval of funds prominent — to motivate the proper design or exception process.
- **Architecture traceability:** To achieve optimal performance from an architecture, it should provide guidance that is directly linked to sound strategies — both business and technological. An important test, when a technical choice has been made, is that the reason for the choice is *traceable* back to the business drivers whenever possible, and not be chosen because it is considered "cool" by the technology staff.
- **Architecture:** (two definitions in common pragmatic use) 1) The description of a complex system — generally its purpose, structure, components and their corresponding relationships, with varying levels of detail, often at a particular time, either today (for example, "our current network architecture") or as a target in the future. May include principles and values (this definition applies to buildings, landscapes, or wherever architecture is applied). 2) The series of guidelines — standards, processes, methodologies, or policies and rules that are intended to direct the behavior of designers as they build or acquire new systems, functionality, or capabilities. Ideally derived from a conceptual framework with goals, principles and values — to create an organizing logic. May be analogous to a building code.
- **Architecture:** The vision, including the topology, components and specifications, for forming IT solutions to business needs. Architecture is comprised of a product, processes and organization.
- **Baseline architecture:** The technology in place. (Same as **as-is** or **today** architecture.)
- **Benefits of enterprise architecture:** A crucial area of attention, because this becomes the basis for all justification of architecture. The primary benefits fall into two major areas — the first is lower IT costs, largely based on standardization, and the second is improved information access (interoperability), based on integration. Each of these areas can be broken down into a number of specifics (for example, architecture produces more stable new applications that install easily), and should be documented through detailed local illustrations that are meaningful to the audience. Other benefits may include faster development cycles, greater flexibility for change, greater security, higher technical expertise, easier mergers and acquisitions, more-focused attention and realization of business advantages.

Glossary of Terminology (Cont'd)

- **Blueprint:** This is a frequent metaphor in architecture due to its relationship to the products of building architecture and construction. It should be used with caution, however, because it represents a particular design — either built and in place or to be built in the future. The term works in the sense of architecture describing a complex system, but it is not effective as a series of general guidelines to be followed. The blueprint represents a design that should be created in accordance with the relevant guidelines. If a migration is part of a strategic direction, blueprints typically can document several stages of the migration.
- **Bottom-up architecture:** This represents a strategy to initiate or organize an architectural effort that starts at the bottom with the component parts or bricks that are to be used. The focus is on selection and use of standard piece parts, which can be assembled into various components, services or functions that will enable a solution. This is a comparatively straightforward effort but is limited in potential payoff. The result may be standardization but not tight alignment with the business strategy or drivers.
- **Business architecture:** This represents the business view — often in the form of the overall value chain for an enterprise, which may then be divided into a series of business functions or departments. These may then be defined as a series of business processes, with each process potentially being divided into activities, then further broken down into tasks. None of these steps necessarily involves the use of IT. Nevertheless, it is the role of IT to enable the effective and efficient execution of these processes. The coverage and inclusion of business architecture is typically the added element that raises the topic of IT architecture to the level of enterprise architecture.
- **Business drivers:** Business drivers are the needs and goals important to the success of the business that may influence the nature or personality of the architecture. This is where architecture must start. Simple examples of drivers include low-cost application execution and maintenance, fast time to market for new products or services, a high degree of flexibility or agility, a high level of security against failure or improper access, and great ease of use. Each driver establishes criteria that often conflict with that of other drivers. Therefore it is essential to choose consistent and relatively few drivers to pursue, to make a clear and noticeable difference in the resultant designs and systems.
- **Business needs/goals** (see **business drivers**)

Glossary of Terminology (Cont'd)

- **Business processes, styles:** This is the second layer or plane in the new Gartner architecture view, which also focuses on the business dimension of the architecture. The contents of this plane are the entire array of different business processes that are carried out within one of the enterprises that is part of the business relationship grid above it. An added characteristic of the business processes is introduced by grouping business processes in clusters according to certain common characteristics. Each cluster can have a distinctive set of computational needs, which can be described as a style. The initial set of business process styles includes real-time operations, online transaction processing, analytical, collaborative and utility. Each of these business process styles has its own demand for certain computational capabilities and resources. Based on each different set of computational needs, it is appropriate to establish a corresponding set of architectural specifications to suit each style to gain optimal IS support. It is another way to align the architecture and IT performance to the business environment.
- **Business relationship grid:** This represents a plane or grid of many enterprises that coexist at the top level of Gartner's new enterprise architecture view. Originally named the Multienterprise Grid, this name has been chosen because it more fully represents the focus on how enterprises must exchange information among other entities on a more-intensive level than the past. The term implies that each enterprise must consider all of the ways in which information is exchanged with other firms, organizations or people. The intent is to stress the vital connections that an enterprise has with its suppliers, customers, partners, regulators and channels. It emphasizes how the demands for intense information exchange at this level have grown rapidly due to the Internet, e-business, supply chain management, business process outsourcing, knowledge access and so on. Because of this intense exchange, it is appropriate to add some additional capabilities and architectural guidance in the form of translation, routing and self-healing, which add intelligence so that overall interchange performance can be handled efficiently through a joint approach, as opposed to each individual enterprise tackling the same tasks again and again.
- **C4ISR:** A specific framework for architecture developed for use within the U.S. Department of Defense. The primary focus is to define "things to be built" — thus spelling out the detailed design requirements for a specific system. It contains both Essential (10) and Supporting (18) views. The major descriptive sections (views) are divided into four categories: Common (the context), Operational, System and Technical. For a system, activities and nodes (people, locations or facilities) are spelled out with all of the required data transfers. Within the Technical section there are two views. TV-1 is the Technical Architecture Profile that lists the relevant standards to be applied in the design (that must be extracted from the Approved Technical Standards List). It also requests information on those areas where standards do not exist. TV-2 contains the Standards Technology Forecast.

Glossary of Terminology (Cont'd)

- **Compliance:** Concerns the degree to which a new system has been built in accordance with all appropriate guidelines and processes. Compliance must be determined — often by an architecture review board. The granting of exceptions may be part of the process. A high degree of compliance is necessary to gain the desired benefits from the architecture. Noncompliance may result in loss of funding, support or other factors to encourage and motivate full cooperation. If compliance is only suggested or recommended, the benefits may be minimal.
- **Conceptual view:** This architectural view of a system or application consists of the context, including the purpose, intent and values relevant to the task.
- **Data architecture:** Covers the sphere of managing data. Takes the same definitions (as-is, to-be and guidelines) but applies them to information content, objects, databases, data warehouses, data access tools, information organizational principles, data extraction, data scrubbing and so on.
- **Data Architecture:** Defines the relationships between data components such as entities and attributes.
- **Discipline/ Brick:** This is a common metaphor for the basic building blocks or elements that are to be employed in the design and development of a new system or capability (this is the fourth or bottom layer of the new Gartner view of enterprise architecture). Bricks may be basic devices such as routers, disk drives or PCs, or they may be software products, including databases, middleware elements or even purchased business components. They are generally the physical-level piece parts that can be assembled in patterns to become a complete application or capability.
- **E-government:** The transformation of public sector internal and external relationships through net-enabled operations, IT and communications to optimize government service delivery, constituency participation and governance.
- **Endeavors:** An endeavor coordinates a variety of programs and projects to create a new enterprise. Often done for survival and to meet the citizens' needs in a timely, effective, and efficient manner. An Endeavor can last for many years and requires creative leadership at the very top. Examples of endeavors include e-government, GIS, WAN.
- **Enterprise Architecture (EA):** An IT architecture that focuses upon only those computing requirements that are mission-critical to the enterprise.
- **Enterprise architecture:** The addition of the word "enterprise" extends the coverage of architecture to the business realm — including the mission, value chain, business strategy, business functions and business processes, which together describe and define the role of the enterprise. The business-level description may or may not include the application of IT. Enterprise also implies the entire breadth of the enterprise, as in enterprisewide architecture. This is added to the traditional architectural coverage of information, or "solution" architecture and technical architecture.

Glossary of Terminology (Cont'd)

- **Enterprise Resource Planning (ERP):** A concept developed by Gartner describing the next generation of manufacturing business systems and manufacturing resource planning (MRP II) software. It includes the client/server architecture, uses graphical user interfaces (GUIs) and can be crafted with open systems. Beyond the standard functionality that is offered, other features are included (e.g., quality, process operations management and regulatory reporting). In addition, the base technology used in ERP will give users software and hardware independence as well as an easy upgrade path. Key to ERP is the way in which users can tailor the application so it is intrinsically easy to use.
- **Exceptions:** Permitted deviations from the use of guideline standards or processes that would normally apply. When circumstances warrant it, a request for an exception from the architecture guidelines can be made to the architecture review board or enforcing office. The rationale is presented, considered and resolved based on understood criteria. The primary criteria to apply are the impact on the benefits that the architecture is intended to deliver, compared to the local advantage or disadvantage of complying.
- **External Service Provider (ESP):** A firm that is a separate legal entity from the contracting company and that provides services such as consulting, software development (including systems integration) and outsourcing. External service providers supplement the skills and resources of an in-house information services (IS) department. Common functions of ESPs include: Outsourcing to reduce costs and improve efficiency. System integration to provide programming expertise and supplemental resources. Consulting and project management to provide experience and knowledge.
- **Governance:** This covers the process of making decisions and providing for their monitoring or enforcement. It includes who participates in the process, the basis of approval (voting or advisory), the jurisdiction or scope of the decisions, and should also incorporate follow-through to verify that the decisions are being implemented and that policies and rules are being complied with.
- **Guideline:** The general term that incorporates all of the appropriate guidance for the process of building new systems or capabilities. They may include the use of standards, specified processes, rules of behavior, policies, patterns and other means of behavioral advice for use in the process of design and construction. They are action-oriented and are applied generally as money is being spent.

Glossary of Terminology (Cont'd)

- **Hybrid architecture:** This represents two types of architecture working together to play complementary roles in an enterprise. One type is the enterprisewide architecture guidelines for the base global underlying infrastructure — such as communications networks and security practices. The other is the local business unit or functional department guidelines covering the applications, packages and special databases that are relevant to the sales or R&D departments and their particular needs. It becomes a hybrid when the local guidelines work "on top of" or complementary to the infrastructure. The issue becomes where to draw the line between what is enterprisewide and what is business-unit controlled. This will evolve to suit the local needs and should be based on gaining the overall best benefits from using architecture.
- **Information architecture:** As noted in the **architecture domains** definition, this term represents one of the major components of the enterprise architecture, along with the business architecture and the technical architecture. Information architecture represents a broader view related to creating solutions; including the data, the business logic and flow associated with a business task. The specific domains contained within the information architecture are the data domain, applications domain, integration domain and point-of-access domain.
- **Information flow diagram:** A graphical representation of the flow of information in support of an enterprise and its activities. The intent is to portray the fundamental information flow and sequence that is central to fulfilling the business mission. The diagram reveals the end-to-end process perspective, which may come as a surprise to enterprises that have traditionally viewed all systems as part of a function or department. It can be very abstract and high-level or very specific, drilling down to HTML implementation. The information flow diagram should be available at many different levels of detail to suit the audience being addressed. One intention of the flow diagram may be to reveal the impact and relevance of applying architecture to gain simplification and efficiency among systems.
- **Infrastructure Architecture:** Defines the relationships between infrastructure components such as servers, networks, end user devices and system management.
- **Infrastructure domain:** The base foundation of capabilities in the form of computers, operating systems and networks (not to mention the staff skills) that creates the environment for the development and use of applications that perform specific business functions, such as e-mail or customer relationship management. This word is subject to many interpretations, but, in this context, it would include, for example, middleware such as integration brokers in the sense that brokers provide the capability to share data that can be used to perform some business tasks in an application. Architecture plays an important role in defining the infrastructure guidelines and also can set the future direction of the enabling infrastructure for future application capabilities.

Glossary of Terminology (Cont'd)

- **Integration domain:** Integration architecture has been the most active sector of architecture effort during the past four years. The primary task has been to establish sound guidelines for application-to-application sharing and the exchange of data. Driving forces have been enterprise resource planning, supply chain management, e-business, packages, outsourcing, and other drivers demanding intense sharing of information across various boundaries in a consistent and efficient manner. This has become the world of messaging, event managers, metadata repositories and managers, adapters and brokers — plus the creation of integration competency centers in the form of skilled personnel to apply the strategies and tools to real integration problems. Architecture has played a strong role in this sector.
- **ISO/IEC 17799 (Security Standards):** The ISO's international standard (derived from BS7799) includes these major sections: Security Policy, Organizational Security, Asset Classification and Control, Personnel Security, Physical and Environmental Security, Communication and Operations Management, Access Control, Systems Development and Maintenance, Business Continuity and Compliance.
- **IT Architecture:** A vision for how information technology will be assembled to solve business problems. It usually includes multiple sub-architectures for Application, Data and Infrastructure Domains. It often defines architecture for security and may include management and governance architectures.
- **IT Infrastructure Library (ITIL):** ITIL is a well-established, mature process model for IT services management. More recent extensions encompass applications management life cycle and infrastructure management. ITIL covers processes such as operational change and configuration management, and service desk. Because of its specific IS best practice approach, ITIL is very focused and much more detailed in terms of the processes it describes — even if that does not equate to a step-by-step breakdown. Certainly, it is more focused than other generic frameworks for performance and quality improvements, such as ISO 9000 and Six Sigma, which require some level of adaptation.
- **Logical view:** This architectural view of a domain, system or application stresses the application function or task to be performed. This may include activities, interactions, content, flow and event timing.

Glossary of Terminology (Cont'd)

- **Migration plan:** Architectural migration is a frequent topic as enterprises plan to move to a new target architecture from the present or as-is environment of today. The migration may apply to a whole new style, as in moving to Web-enabled applications, or to a shift in brands of PC. In general, the migration may be triggered by architecture decisions about a new technology to employ. The architecture process performs the analysis and makes the technological-choice decision. The decision to spend money and execute the migration is *not* part of architecture, but rather of the strategic planning task — which determines the best allocation of resources or funding. To illustrate, the decision to choose a new model of PC for all future purchases is an architecture decision, but whether to spend the money now to migrate the older PCs to the new model is a strategic-planning decision. Coordination is essential.
- **Migration stages:** When considering the migration process from as-is to to-be, the move will typically not come all at once but gradually. It is generally wise to prepare a planned series of moves or sensible stages of migration to cause the least disruption in current services.
- **Multienterprise grid:** An original term for the top layer or plane in the new Gartner enterprise architecture view, which has been renamed the Business Relationship Grid (see **business relationship grid**).
- **New enterprise architecture:** The "new" represents a shift in emphasis toward business drivers and how they direct the character of the architecture. The new Gartner view of enterprise architecture is illustrated in four horizontal planes with the top two — the Business Relationship Grid and Business Processes, Styles — representing exclusively the business dimensions of the enterprise. The remaining two planes consist of Patterns and Bricks — a way to look at the logical and physical dimensions of the traditional technical architecture. All four planes are usually involved in any solution design whether a packaged application or the concept of the enterprise nervous system. The lower two planes are further intersected by other, more-traditional, domains, such as information architecture, integration architecture and security architecture.
- **Open-systems architecture:** The drive to get all vendors to adopt open systems ultimately failed. Instead, certain products became de facto standards (arguably Microsoft Outlook), and other standards emerged from organizations supporting TCP/IP and HTML. Now, we take these standards for granted and assume that certain de facto standards will emerge for wireless, Web development and other applications. The task today is determining which products to support and how to achieve integration among them – via internal architecture decisions. The new level of open standards now involves the broad use of TCP/IP, HTML and XML, as well as Linux and similar open standards.
- **Operations architecture:** Similar to organizational architecture, the matter of operations (how to schedule, operate, back up and handle business interruptions) is important but still outside the domain of how to design or develop when in the process of building new systems or capabilities.

Glossary of Terminology (Cont'd)

- **Organizational architecture:** Organizational structures need to be designed, and may have an inherent architecture that needs to be developed. However, in the context of this series of definitions, organizational architecture is not a relevant subject for the specific context of building new systems. Even if organizational issues are important to the application, they are generally not covered within the sphere of specifying the guidelines to be used by the application designers. In the context of building permits and building codes for new construction, the issue of local governance or organizations is not included. It is an important, but separate, matter.
- **Pattern (or design pattern):** A repeatable method, approach or concept that can be applied to solve a design requirement (logical and physical design patterns represent the third layer or plane in the new Gartner view of enterprise architecture). It is comparable to a reference model because it uses a proven solution. For example, if a data-scrubbing requirement comes up, there is a prescribed pattern to follow that can address the task, based on known results and available components. Some prefer to think of physical design patterns as the solution that can be created out of the available/planned bricks or building blocks.
- **Physical view:** This architectural view of a system or application consists of where the work is performed — outlining the specific device, location, capacity, links, performance, backup and support.
- **Point-of access domain:** This domain of architecture is directed at the multiplicity of communications channels that may be employed on behalf of a single external customer. The pathways may include telephone, call centers, fax, letter, e-mail, a broker and the Internet. The intent is to create an architecture that can meet the needs to have a consistent response or message that is synchronized to appear sensible under the circumstances.
- **Portability:** The ability to port an application from one platform or environment to another (instead of being locked-in to a proprietary product) was at one time a principal concern of architecture. Due to the evolution of de facto standards, this is no longer a primary driver. Today there is much more concern with overcoming the inability to share data across systems and with simplifying the complex array of systems, information stores and products.
- **Principle:** This represents an enduring value or belief that the organization wants to uphold or honor. It may be stated in the form of the principle, the rationale behind it and the implications to the organization from observing it. A simple example is the belief that it is better to buy application packages than to build applications internally.

Glossary of Terminology (Cont'd)

- **Programs:** Programs are used to deliver a strategic business change. Programs identify, prioritize and link initiatives, many of which will be projects, but not all. The management focus in this case is on efficiently attaining corporate benefits from the new strategy. A program also provides the right environment for the change to happen, particularly in terms of the staff members' attitudes and behavior. The nature of a program means longer time frames. Examples of programs include developing a major Web presence, implementing ERP.
- **Projects :** Projects are used when a specific outcome is required in a set time frame. Projects have clear and easily defined benefits and return on investment (ROI), so management focus is on minimizing risk and cost. Projects are generally managed within boundaries (such as departments) and have an easily identified and defined scope. Examples of projects include implementing an intranet, a fleet management system.
- **Road map:** This term may be used in two ways. One is essentially the same as the blueprint or migration, meaning the specifications of what is required — "where we are going." Perhaps a more suitable use is that of the "technological road map," which is a common architecture product. Here it is used to describe the development or expected evolution of a particular technological sector, such as wireless. The road map describes the progress to date, where the industry is expected to go in the future and perhaps what the competition is doing. It is used to help determine when the next advance may be suitable for the enterprise. It can act as a trigger.
- **Section 508 Accessibility Requirements:** Section 508 of the amended Rehabilitation Act of 1974 went into effect in June 2001. Section 508 requires federal agencies to procure and implement accessible electronic technology and IT. Section 508 includes rules for developing accessible Web content and software, and for implementing other electronic technology and IT, such as copiers and telecommunications equipment.
- **Security Architecture:** Defines the relationships between security components such as monitoring, detection and suppression components.
- **Security domain:** This is an increasingly important issue for most enterprises. Establishing a single consistent approach to security design — incorporating encryption, authentication, public-key infrastructure — serves the enterprise's needs, rather than having a variety of techniques and products employed across the organization. Varying levels of need and capability are designed into the basic security architecture plan.

Glossary of Terminology (Cont'd)

- **Self-certification:** Rather than always depend on an external architecture review board that tends to act as a "police force" to enforce compliance, an alternative approach is to let the system designer creating the system perform the certification function on his or her own. Verification that the system is working can be accomplished based on a random sampling of the self-certified designs. The essential element here is that the architecture guidelines are readily available, easy to understand and apply, and that consulting support or advice is simple to obtain. The task of performing self-certification must not be onerous. However, there should be consequences for nonperformance.
- **Service-oriented architecture (SOA):** This represents a style of architecture primarily for application development that is typically multitier and based on the principle of dividing business processes into a series of subunits or services. The services can then be assembled and linked together in a loosely coupled environment to perform a desired application. The services are defined at a level above that of the traditional view of components. Re-use, speed of design and flexibility are the desired goals.
- **Stakeholder:** Stakeholders include all State agency representatives, the executive branch, and representatives from all State offices.
- **Standard:** A standard is the norm — the approved or accepted way of doing or buying something in most cases. It may exist in an industry or within a particular firm. It may be a legal requirement (a de jure standard — for example, the U.S. Health Insurance Portability and Accountability Act), or it may have just arisen (a de facto standard — for example, Microsoft Outlook). Within one IS organization this is usually applied to an IT component or characteristic of some type that has been approved for use and is on the approved purchase or "buy list" of the purchasing organization. It represents the selected or preferred choice, unless a specific exception has been granted. It acts as a primary guideline for architecture. However, many practitioners say that, "standards do not make an architecture." This view is valid because the desired benefits will rarely be achieved by merely buying-off a prescribed set of piece parts. The larger values, principles and patterns based on business needs and goals must be the primary drivers. Nevertheless, the use of standards can be beneficial in itself, such as the de facto use of HTML.
- **System management domain:** This is a subsection of the technical architecture that concerns itself with the many issues involved in designing the appropriate monitoring capability and operational practices to gain desired levels of service and reliability.
- **Taxonomy:** A hierarchical array of items expressed in words that capture logical relationships for ease in comprehending the whole. When applied to architecture, it facilitates use by enabling both search and browse capabilities. It organizes the diverse array of components and views (see **technical reference model**).

Glossary of Terminology (Cont'd)

- **Technical architecture:** The generic term that applies to the collection of hardware and software components and processes that mostly fall within the province of infrastructure — the "guts" of the computational world where technology is king. This is a complex arena further divided into several other areas or domains. In the new architecture model, the major domains are infrastructure, security and system management. Such subdivision can provide some relief from complexity by defining interfaces in such a way that changes can be made in one domain without requiring changes in other domains. The same as-is, to-be and next-minute guidelines apply here.
- **Technical reference model:** An organizing structure for categorizing the various technical architecture standards and processes in a coherent manner to facilitate location and navigation. The model is organized according to a taxonomy — a hierarchical structure of areas, domains and elements using a vocabulary. An example would start at computer systems, which contain software (among several other things), which contains an operating environment, which contains middleware, which contains integration brokers, and so on. By using a consistent taxonomy, as people explore, add to and modify, they can find their way efficiently.
- **Technology road map** (see **road map**)
- **The Open Group Architecture Framework (TOGAF)** This architecture framework has been created by The Open Group as a tool to facilitate the understanding and use of "open standards," which is the mission of The Open Group. Within its Architecture Development Method (a straightforward, eight-step process from vision to change management), it places considerable stress on the business environment and demands — and has adopted concepts from the early Posix work on how to define the linkages from the business demands to the architectural choices. It also supports a large Standards Information Base that essentially contains all open standards.
- **Timing/event diagram:** This represents another tool that can be used to describe a particular architecture or system design. It is a means of showing a sequence of actions that occurs in a system as a result of some initial trigger. It can be illustrated in a table or "swim lane" format. The use of this tool complements other descriptive perspectives.
- **Top-down architecture:** This represents a strategy to initiate or organize an architectural effort that starts at the top or the business strategy and direction level, and then works down to business processes, business activities and the subsequent layers of information, application and integration architecture that employ the infrastructure, security and system management architecture. The benefit of top-down architecture comes from making a series of choices that are directly traceable back to fulfilling the business needs and goals. This objective has been hard to accomplish because architects (who are usually technology-oriented) are generally not good at perceiving the link to business results and performance.

Glossary of Terminology (Cont'd)

- **Vision:** A description or picture of where you want to be at some point in the future. It can be functional, technological or organizational. The vision is represented in the to-be or tomorrow architecture.
- **Zachman Framework:** John Zachman published a seminal article on this architecture framework in 1987, starting with a matrix with six levels of abstraction (rows) and three levels of characteristics (columns). He extended the characteristics by three more columns several years later. This framework is the root of many descriptive models and systems. It depends on the analogy of building a house — with roles for owner, architect and builder, and includes descriptive characteristics such as motivation. The primary criticism leveled against the framework is that it takes an enormous amount of work to complete. As a result, most successful users have chosen to limit the number of rows and columns, which gives them adequate value without demanding so much work.

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